

THE AUTOMOBILE

The Portable Garage: Synonym for Economy and Convenience

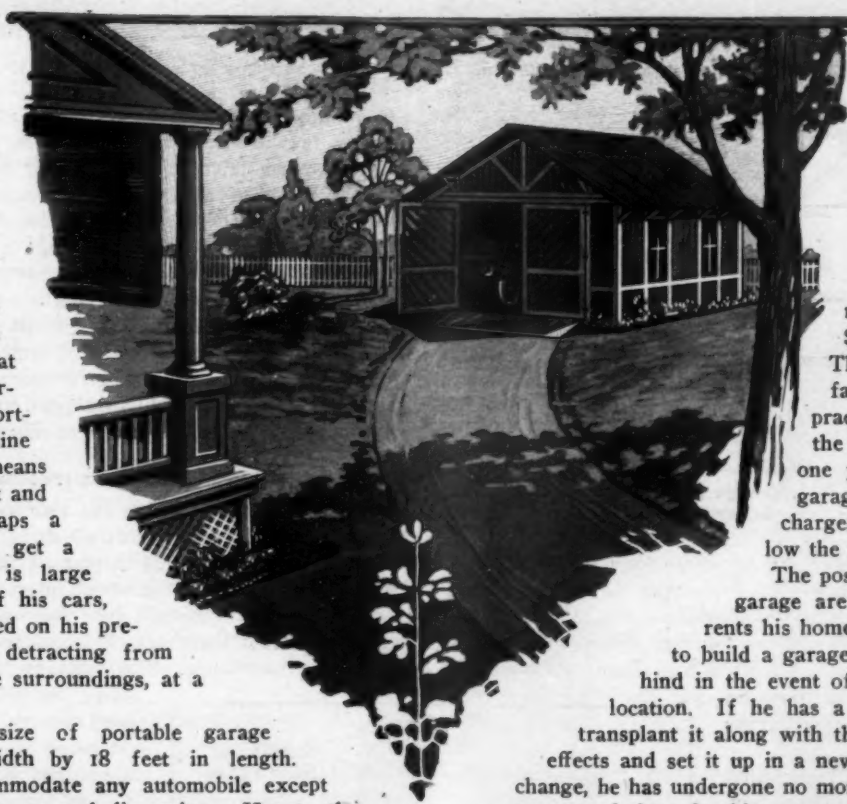
THE portable garage offers the simplest and least expensive solution of the problem of housing the automobile. The man who owns a small runabout and who has very little available space on his premises can get a small portable garage to fill his needs for \$72.50. The city flat dweller who owns a touring car can purchase a portable house for his machine for \$85. The man of means who owns both runabout and touring car, and perhaps a limousine as well, can get a portable garage which is large enough for all three of his cars, and which can be installed on his pretentious estate without detracting from the attractiveness of the surroundings, at a cost of \$475.

The most popular size of portable garage measures 12 feet in width by 18 feet in length. This building will accommodate any automobile except the very large touring car and limousine. Hence, the average automobile owner who has an available yard space of at least 216 square feet, can, if he is so disposed, keep his car on his own premises in a portable garage, provided, of course, there is room for a small roadway for access to the street, or better still, if there is an alley onto which the garage can open.

No skilled mechanic is required to erect the portable garage. Any person with ordinary intelligence can, with the aid of the simple directions which accompany the outfit, set up any portable affair which is now on the market.

There are on the market both metal and wood portable garages suitable for the garaging of any type of car from the small runabout to the seven-passenger limousine or touring car. Besides these, a number of the manufacturers can furnish buildings for the accommodation of several machines.

The typical portable automobile house is really a knock-down affair which requires only 5 to 10 hours to erect. It comes in sections which are joined at the seams in a number of ways. These sections are interchangeable, so that if the buyer does not care to have a window or door in a certain



part, he can put a solid section in its place, and fit the window elsewhere. It is really the sectional bookcase principle over again.

The cost of quartering a car in a public garage depends on the locality and it ranges anywhere from \$250 to \$500 a year. Therefore, aside from the fact that its first cost is practically its only cost, the portable is cheaper than one year's rent at a public garage, even when the charges at the latter are below the average.

The possibilities of the portable garage are big for the man who rents his home and who does not care to build a garage which must be left behind in the event of his moving to another location. If he has a portable affair, he can transplant it along with the rest of his household effects and set it up in a new place. By making the change, he has undergone no monetary loss so far as the accommodations for his car are concerned.

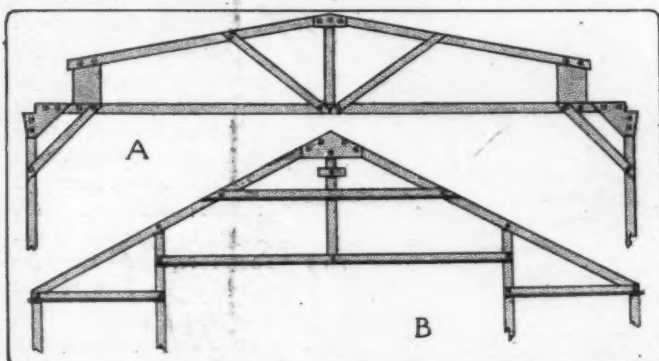
To many the automobile has become an absolute necessity. They plan vacations, trips and day outings, but these are all based on the ability of their cars to take them where they want to go and to bring them back. If Mr. Motorist takes a cottage for the summer, he does so only after due consideration of its distance from his place of business, the roads over which his car must travel to and from the cottage location, and the accommodations which are offered for his machine.

But now that the market is well supplied with all styles of portable garages at all prices he need not be so deeply concerned as to whether or not there is a public garage in the vicinity of his summer home, nor is it necessary for him to convert a nearby barn with all its disadvantages into a shelter for his car. At small cost and with the expenditure of 5 or 6 hours' labor he can transfer his portable garage from town to his summer home.

A large percentage of the cars which will be sold this year will be delivered into the hands of persons who have never before owned machines, and to these new automobilists the garaging problem is a particularly pertinent one. In many cases they



A typical portable garage installation. The garage faces the alley and opens onto it



Two types of roof frames—A: Design for no eaves; B: Steeper form for overhanging sections

have purchased without thought of where they will keep their new possessions, and after a few months of public garage piracy they will have reached the conclusion that if they are to keep house and home and machine together some other method of housing the car must be resorted to. Then the questions arise as to what this method is to be, and here is where the portable garage enters.

Then it is important to know what will be the best size of garage to buy, what amount of land will be necessary for it, whether it can be erected by the owner himself and what the exact cost will be.

Many are skeptical of the portable garage, for they believe that since its walls and roof come in sections there is apt to be leakage at the seams where any two sections come together. This, however, is a wrong impression, for the makers of these portable houses have carefully looked into this part of their constructions and a number of ways of effectively locking the seams together to the exclusion of water and air have been devised.

In most cities building laws prohibit the erection of small wooden garage structures in close proximity

to dwellings, since they would increase the fire hazard and incidentally the insurance rates. It is in these localities that the fireproof portable garage is specially adaptable.

These fireproof affairs are usually made entirely of metal, either sheet iron or sheet steel. The side walls are smooth or corrugated or have ornamental designs pressed into the metal.

In the prevailing metal garage construction no framework is required, the wall sections carrying the roof and being so bolted and fastened together that they resist all wind pressures. In this type of garage the network of frame pieces which are to be seen in the typical skyscraper construction are absent. The strengthening pieces which correspond to the parts of the framework of a permanent building are made a part of the sections.

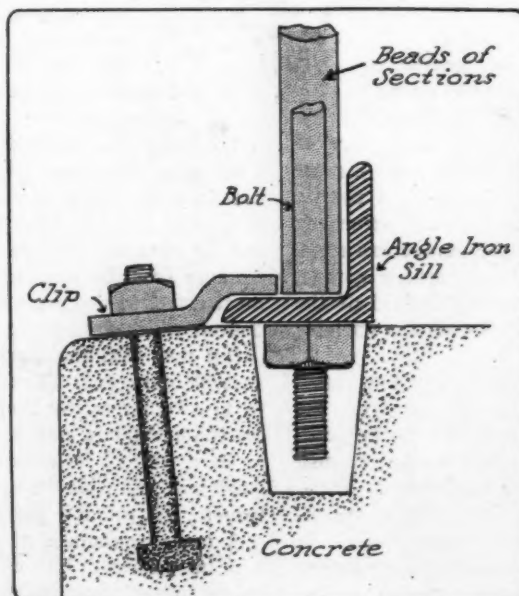
Many Quick Construction Features

In one metal garage design the side and end wall sections are fastened together by studs which form a part of the integral wall after they are locked in place. The edge of each sheet is formed into a hook or bead which interlocks with the bead on the next sheet, thus forming a tube into which a rod is slipped to hold the sections together. This construction is very similar to that of the door hinge.

The rods are then bolted to the bottom piece or sill, fastening the whole wall together into one solid piece of sheet metal. The sills are of angle-iron material and are anchored to the foundation by means of specially bent clips held down by bolts embedded in the concrete.

In installations where concrete foundations and floors are not used the anchor pieces are fastened with lag screws to posts set in the ground. The bolting features preserve the portable idea.

Before being slipped into the tube formed by the beads of the two sheets the studs are put through holes in the eave pieces so that, when the studs have been fastened to the sills at the bottom, the eaves are also held in place at the top of the wall sections. The outer edges of these eave pieces are bent over to receive one end of the pieces which are slid into the slot thus made and which span the space between these



How the sills are anchored to the foundation in one construction

eave-ends and the ridge piece at the top of the roof. There is a similar slot provided in the ridge piece to receive the other ends of the metal roof sections. The roof sheets are fastened together by means of the beads, but there are no studs, as in the side wall construction.

The sections come in interchangeable 2-foot lengths, this applying to the roof sections as well as those for the side walls. Windows may be inserted in the walls in special panels 2 feet from any corner section. The latter sections are made right-angular to fit the corners and they have a width of 2 feet either way.

Another type of metal garage construction makes use of a separate steel frame to which the metal walls and roof sections are fastened. This main frame is made up of vertical and horizontal braces, all of its members being of angle section. Each piece is fastened in place by means of a single bolt at its end, the hole in the brace piece registering with that in the main member to which it is bolted.

The wall and roof sections or panels are reinforced by electrically welding to them rectangular steel angle frames made up of 1-inch material. Special grooves in the sections are made to fit to the building frame in stationary clips which form the tongues on the horizontal rails of the main frame. The edges of the sections engage with one another on the tongue and groove principle, forming air-tight joints between the sections. No bolts or screws are used to hold the panels to the main frame, except two locking bolts at the extreme ends of the walls.

Some Garages of Corrugated Iron

Roof sections in this garage are of the same construction as the side members with the exception that the edges are upturned and curved to engage with elliptical strips of galvanized steel which telescope the curved edges of the sections and form a roof which is water-tight.

In still another form the metal garage is made in 4-foot sections which are of corrugated iron instead of the more usual steel construction. The metal is riveted to steel angle frames which are reinforced at the corners with heavy right-angle triangle gusset plates. In this case each section is fastened to the next with three bolts. The rear corners are the first to be attached to the foundation, and after they have been bolted down the other panels are added. The roof pieces are bolted to the side walls by the aid of triangular gusset plates.

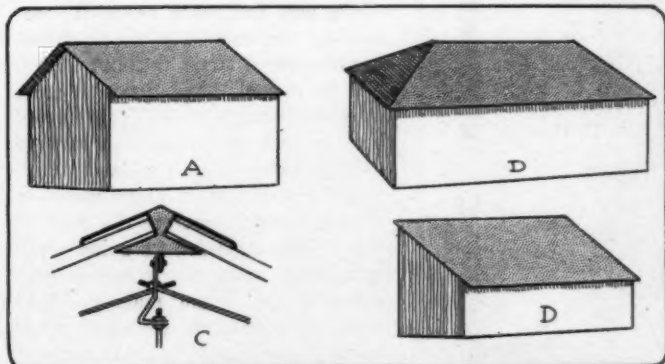
To safeguard the premises against fire one manufacturer is making a portable garage the metal panels of which are covered with asbestos both inside and out, the idea being to make the building rust and waterproof as well as impervious to fire. The same general principle of sectional construction is adhered to in this as in the other types.

In one make of the wooden garage constructions each of the walls is made in two sections, thus doing away with outside studding. The intersection studding is splined and bolted together, making a water-tight and wind-proof joint. In erecting this design the end walls are put up first (the foundation having been already laid) and are followed by the side walls. Next the

front section is put up and the doors hung. The corners are drawn together with lag screws, after which the roof is put on. Plates on the roof sections are bolted to plates at the top of the side walls and to the ridge at the top of the roof, thereby insuring the construction against wind and leakage. The roof section joints are capped by battens which are ploughed out to fit over the ridge of the roof. The frame is made of 2-inch material.

The cost of building a permanent garage which will afford the same protection, give equal service and have as good an appearance as its portable brother is very much greater than that of the ready-made house. Of course, there is a wide range of prices for these portables, depending on the size, the general makeup and the style.

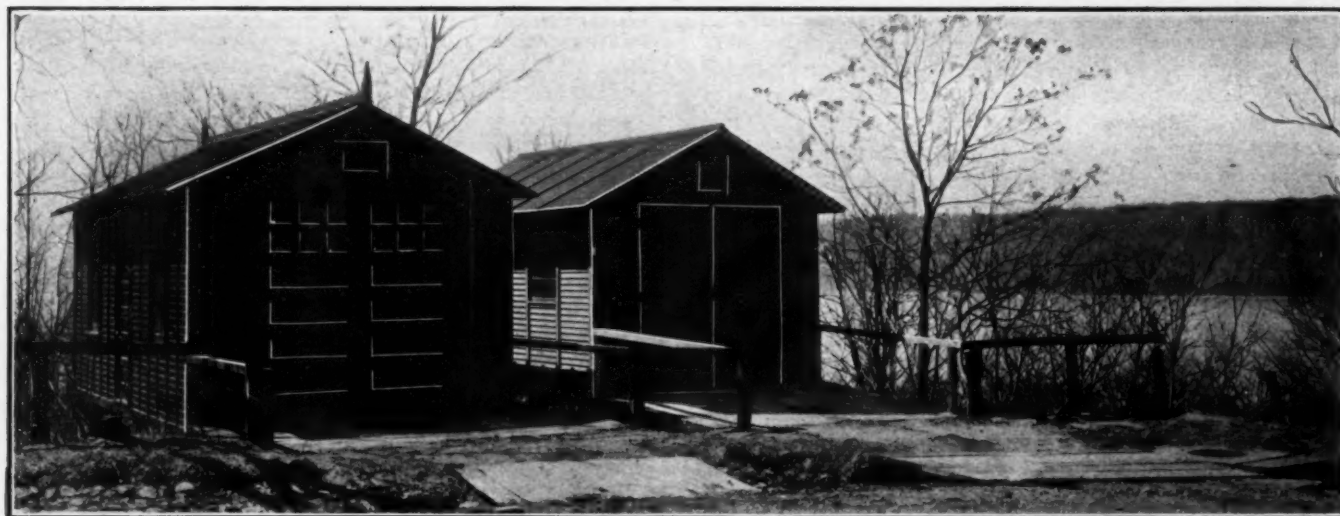
For the small runabout a garage 10 feet long by 12 feet wide is about the best, and this size costs anywhere from \$72.50 for a wooden affair to \$160 for a fireproof metal house. For districts where there is plenty of room, such as a country home, the fireproof feature is not so important as it is in the city where fire laws are very strict, so that the small car owner in the country need not pay as much as the city man. Of course, there are a number of garages of about this size which are intermediate



Roof Designs—A: Gable; B: Hip; C: Roof support detail; D: Shed



Utilizing a vacant lot in a big city without infracting of the laws relating to fire prevention



Two neighborly portable garages on the shore of the Hudson

between the two extremes mentioned. This is true of the frame garage as well as of the all-metal one.

A car having a wheelbase of about 120 inches, such as the pony tonneau machine or the small touring car, can be housed very comfortably in a garage which measures 14 feet long by 12 feet wide. For this size the dealers ask prices varying from \$90 to \$200.

Garage Sizes Often Deceptive

For the large touring car a convenient size of portable house is the one which has a width of 12 feet and a length of 20 feet. This size sells between the range of \$100 and \$360, depending, of course, on the elaborateness and general finish.

The intending purchaser of a small portable garage is apt to consider one which is too small. The mistake should not be made of getting a building which will not allow for working around the machine when it is inside. Of course the argument may be advanced that the owner does not expect to do much work on the car when it is in the garage, but there are times when odd jobs must be done when the wind and rain outside make the shelter of the garage imperative. Small adjustments are not difficult to make, but when the quarters are cramped they are sometimes rendered almost impossible.

For these reasons the garage sizes given are somewhat larger than many intending buyers will deem necessary. In all cases the widths have been given as 12 feet. All machines average about 6 feet in width overall, and a garage of this width gives a clearance of 3 feet on either side, which will be found to be very acceptable in the event of a tire change or other job which has to be done from the side. Nearly as much working space should be given at the two ends, also.

If it is desired to have a workbench in the garage, 2 more feet should be added to the length to provide for it. Most manufacturers do not furnish these benches with their garages, but the building of one is a very simple matter. The best location for such a fixture is in the rear in front of a

window. In this position it is most convenient to both sides of the car and is least in the way.

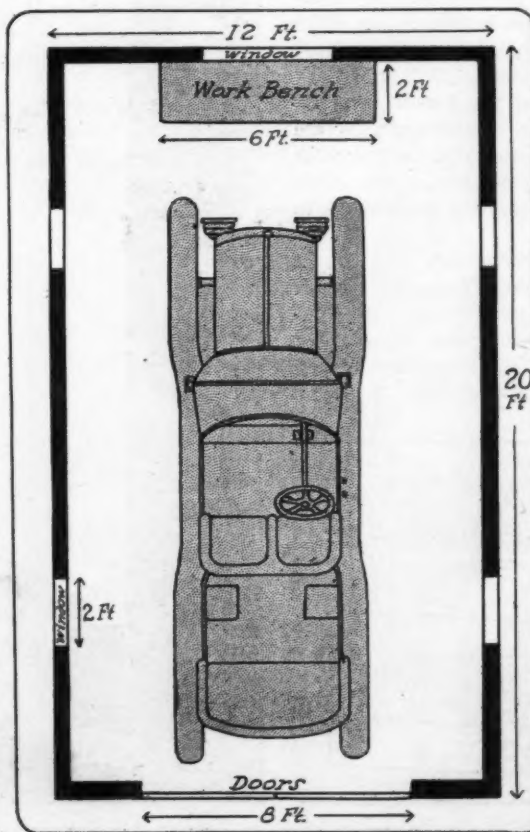
The man who has an eye to the future will purchase a garage which is large enough for a touring car, even though he may have only a small runabout at the present time. He may next season get a larger car, in which case his 14 to 20-foot garage will be ample. In most portable constructions which are now on the market, however, it is a comparatively simple matter to add one or two sections to the length of an existing garage, should it not be found long enough for a larger car. It is here that the sectional principle is particularly desirable. The house can be stretched out to suit the owner. It costs about \$15 for each additional 2 feet.

While these remarks have been confined to garages which are suitable for one car only, several makers are in a position to furnish them for two or three cars, if desired. The prices are

around \$400 for the two-machine house and \$500 for the one which has accommodations for three cars. Such constructions have possibilities which are not to be overlooked. THE AUTOMOBILE knows of one instance where three neighbors, neither of whom had room enough for a garage on his own premises, clubbed together and bought a three-compartment garage which was placed partly on each of their properties, and which had a single driveway leading to it. The house has three individual compartments, each of which can be locked separately from the others, the cost is less than three single affairs and the space required, considering the use of a single driveway instead of three, is about half.

As to foundations, manufacturers of these portables have constructed them so that they may be anchored to either concrete or wooden frames. If the installation is to be more or less permanent, concrete for floor as well is recommended as being more substantial, offering greater protection to the car and making it possible to wash the machine when within.

If the foundation is to be of wood, foundation posts should be



Ideal layout for a one-car portable garage

used. These should be painted first, to prevent decay, then put in below the frost line. That is, they should be put down to a depth of 3 feet in the average case. The tops of the posts should be level with the ground. Across these posts, which, by the way, should measure 6 inches in diameter at the butts, the mud sills should be laid. These latter should be at least 2 inches by 4 inches in section. Sills as large as 4 by 6 inches are sometimes used. Some owners then fill the floor space with cinders for cheapness, doing away with a floor entirely. It is better, however, to lay a floor of matched material on the ground sills. The side and end sections are then bolted or fastened to these sills in whatever manner is called for by the particular design of the portable garage.

When concrete is used, there are several ways of anchoring direct to it, the scheme which is used in one case being shown herewith.

Several makers furnish floor lumber with their garages, while others do not, leaving this part of the construction to the option of the buyer.

Roofs are of several types, the gable design being the most frequently used. The shed roof, which slants in one way only in the manner of the lean-to is somewhat cheaper than the gable roof, while the hip roof is a little more expensive than either of the others, for the reason that it is somewhat more difficult of manufacture and construction. The gable roof, however, answers all purposes and is the most sensible to buy.

The average weights of these portable houses range from about 2,000 pounds for the smaller size to 3,000 pounds for the 12 by 20-foot size. This is an average which takes in both the metal and the wooden construction, the two varying very little for the same size garage.

As the metal garages come in galvanized material, manufacturers claim that it is unnecessary to paint them at least for the first season. Wooden buildings come properly painted, so that for the first year the buyer does not need to be concerned with painting. Paint properly applied the second year and thereafter will have a great influence on the life of the structure. Proper care should prolong the life of any portable building and make it last as long as any other house. Makers of metal buildings claim at least ten years life for their product.

The building laws of most cities and towns call for a space of at least 5 feet from the lot dividing line of the dwelling, so that in most instances the garage will require a ground space its size exceeded by 5 running feet at the end and side next to line or fence. The country man need not be concerned with such matters as this, since his available space makes it possible for him to put his garage at any desired distance from his house.

For the city man, the problem of lighting the garage is a very small one, for he can have an extension from his house electric circuit run to the building, if desired. The cost for such an extension is very small. It is desirable to light the garage in some way, of course, and oil lamps or lanterns are not advised. They greatly increase the fire risk.

In the country, where there is no municipal lighting plant to help the owner out, the lighting problem becomes more of a consideration. If the owner has a lighting plant on his premises, the lighting of the garage means only the wiring of a line

to it, as in the city installation. But where there is no electric light at all, lanterns or some form of gas outfit must be resorted to, unless it is desired to have a small lighting plant especially for the garage. A lighting plant consisting of engine, dynamo, storage battery and switchboard costs about \$400, so that it is almost prohibitive for the small garage. Its cost hardly justifies its installation, since it requires an outlay even greater than that needed for the garage itself.

In one instance a rather ingenious country gentleman solved the lighting problem for his portable garage by buying a storage battery at a cost of \$50, which, when fully charged, had capacity for lighting two 16-candlepower incandescent lamps for 10 hours. He already had a small electric motor-generator, and about once a week he jacked up the rear axle of his touring car, removed one of the wheels and placed a pulley on the axle in its place. He then connected the pulley on the armature shaft of his small generator to this pulley by belt, cranked up his automobile motor and drove the generator for several hours, thus charging the battery for another week.

But such schemes hardly pay for the trouble and expense which they incur, and unless there is a lighting system on the premises when in the garage at night it is better to make the best of lantern light or light from one of the headlights. In such cases where there is no electric light the repairing and adjustment work should all be confined to the daytime.

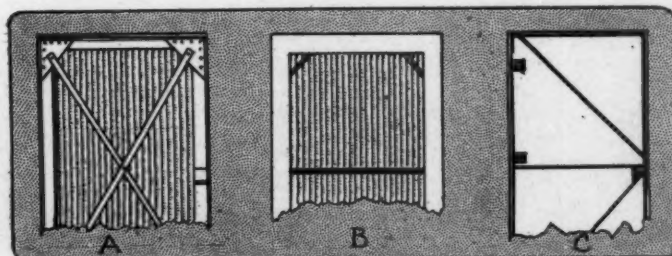
Store Gasoline and Oil Safely

The storing of the oils and gasoline must be looked into carefully. A number of specially constructed gasoline tanks are on the market, and while they are more expensive than the ordinary can, they are most important in connection with the garage. It must be remembered that gasoline is one of the most volatile liquids in commercial use.

In purchasing a gasoline storage outfit it is well to consult the insurance underwriters as to its approval by them, as insurance regulations in such matters are very strict. It is not advisable to store the gasoline in the garage itself unless absolutely necessary to do so by reason of lack of room outside. If the tank must be placed within the garage it is best to use one which is sealed when not in use, that is, a can which will not drip or leak from the faucet. One concern markets a very satisfactory storage can of this kind, which is hung on a steel axis and which is placed off center so that whenever the can is released by the hand it swings back into its normal position, thus sealing itself. It is a very good plan to box the can up in some form of wooden cabinet, thus affording added protection.

If there is room the tank should be placed outside the garage in a small shelter of its own. By such a system the insurance

(Continued on page 898.)



Methods of bracing sections—A: Gusset plates and angle-bars; B: Small angle-corner pieces; C: Half-sectional diagonal braces



Rear view of garages on opposite page. How a sloping location was utilized advantageously

In the Legal Field

Court Decides That Pioneer Chain Grip Is an Infringement of the Parsons Non-Skid Patent

No Rehearing in the Patent Monopoly Case—Nine Additional Dyer Suits

MILWAUKEE, WIS., April 8—Anchored chain grips of the type known under the trade name of Pioneer, were held to infringe the Parsons Non-Skid patent by Judge Sanborn in the United States District Court for the Eastern District of Wisconsin in an opinion delivered in the case of the Weed Chain Tire Grip Company against Herbert R. Johnson.

Judge Sanborn decreed an injunction as prayed for by the complainant.

The chain in suit was provided with an extra piece to fasten around the felloe, thus holding the tread chains so that they could not creep. The court's opinion was as follows:

"Application for temporary injunction against infringement of the Parsons patent sustained in the Weed cases, 192 Fed. 35, 41. The alleged infringing device is the same as that of the patent, with the addition of a chain anchor fastened to one of the side members, and long enough to reach over the felloe and snap into the other side member. If actually used the anchor prevents the chain from traveling around the tire.

"The case has been very thoroughly prepared on both sides, hundreds of affidavits having been taken all over the country. Defendant claims that he cannot possibly be regarded as anything more than a contributory infringer, and that he in good faith intended the anchors to be used by the purchasers of the chains. Without deciding whether this position is well taken or not, I am thoroughly convinced that he never had any such intention. The furnishing of the anchors was simply a subterfuge to evade the rights of the patent owners. A preliminary injunction should issue."

The contention of the defense was that if a chain were so anchored that it would not creep, it did not come within the purview of the Parsons patent. The complainant argued that such a chain would so injure tires that the purchasers of the non-creeping chain would not affix the anchoring chains, with the result that the chain would creep.

Judge Lacombe has handed down his opinion in the suit of Weed vs. Benjamin M. Asch, for a preliminary injunction, prohibiting the manufacture and sale of the Best Chain Grip, manufactured by H. E. McLain, of Natick, Mass., in which he sustains the contention of the complainant and decrees the injunction prayed for. The matter will come up at an early date.

Warner vs. Stewart & Clark Argued

The suit of the Warner Instrument Company against Stewart & Clark was argued before the United States District Court on Tuesday. The suit involves two patents, heretofore described in these columns covering a principle of magnet construction. A decision is expected about May 1.

Mosler Sues for Price-Cutting

Suit has been filed in the United States District Court by A. R. Mosler & Company against the American Auto Supply Company to prevent alleged price-cutting on spark-plugs covered by patents 698,042 and 738,831, both of which were granted to A. R. Mosler. The Canfield basic patent is not involved in this suit.

While the form of action is similar to all suits for infringe-

ment and asks for damages and accounting and an injunction, it is understood in this case that all the claims will be waived except the one covering injunction and that an agreed injunction will be entered prohibiting the defendant concern from selling the patented goods below the agreed level.

According to the complaint the defendant company handles the Mosler product and it is alleged that goods were sold at less than the established price.

Amended Bill in Rhinock vs. Lozier

Amended bill of particulars, ordered by the New York Supreme Court in the case of Rhinock vs. Lozier is due this week and similar procedure will probably follow in the Williams case against the Lozier company and Mr. Lozier personally.

The cases, as outlined heretofore in these columns, have been pending for the major portion of a year and are based upon an alleged contract to sell control of the Lozier company to Mr. Williams through Mr. Rhinock as agent.

Hugh Herndon, attorney for the defense, moved for a rule requiring the plaintiffs to file a bill of particulars in each case. This was granted and in the Rhinock case exception to the bill of particulars was taken by Mr. Herndon, who asked for more particulars. This motion prevailed.

Nine More Individual Dyer Suits

Suits entered on behalf of the Enterprize Automobile Company against Mrs. Sara Bronson, President Winthrop of the Board of Education and Broker R. Suydam Grant, for infringement of the Dyer patents have been dismissed, individual licenses having been granted to each of the defendants.

Harold S. Vanderbilt voluntarily took out an individual license and suits have been entered against the following private owners in the United States District Court; Martha A. Gaines, owner of a Charron; Samuel O. Van der Pool, Metallurgique; Samuel E. Bennett, Charron; Henrietta Buehl, DeDietrich; Edward K. Kern, Sultan; Benjamin J. Coneshey, Sultan; Lucien Ardin, Charron; Jacob Stern, Sultan, and Myron J. Borg, Charron.

Theodore C. Marceau, photographer and artist, owner of a Darracq, was granted a Dyer license without formal suit.

Stromberg vs. Flechter Next Week

Suit for alleged infringement of the two-spring principle of certain types of carbureters, brought by the Stromberg Motor Devices Company against the Flechter Carbureter Company, of New York, in the United States District Court is due for answer next week. Alfred Austin has been substituted as counsel for the defense in place of William A. Redding.

Alleges Republic Broke Contract

J. M. Gilbert is suing the Republic Rubber Company for \$10,000 damages for alleged breach of contract involving the licensing of the defendant to manufacture a certain type of detachable rim covered by patent number 771,445. The suit will be called April 15 in the United States District Court.

The tire company filed a bond at the commencement of the action amounting to \$10,000, as the proceeding was brought by attachment, because the defendant is a foreign corporation.

The defense claims that it abandoned the license rights because of some lack of merit in the patented device.

No Rehearing on Patent Monopoly

WASHINGTON, D. C., April 9—Rehearing of the case of Harris vs. Dick, the so-called patent monopoly suit before the Supreme Court has been denied and the intervention of the government

in the matter has been dismissed. The decision of the court held that patentee had a monopolistic right to his device, extending to the use of materials in operating and using it and following closely the holdings of various United States District and Circuit Courts of Appeal.

In reviewing the case on motion for rehearing, the court took the position that its former decision was not at variance with the law and resulted in no miscarriage of justice. That it was a mere reaffirmation of well-established Federal procedure.

A number of bills have been introduced into Congress at this session to reform the present patent laws. Representative Prouty, of Iowa, is father of one bill to limit the use and transfer of patents, amending the existing law so as to provide that every patent shall bear date not later than 6 months from the time application was filed. The bill also provides that the patentee shall not have the right to control the price at which the patented article shall be sold or the manner in which it shall be sold, except for royalty. It also provides that no limitation of use of the product shall be included in transfer contracts covering the assignment of any patent.

The House Committee on Patents, of which Representative Oldfield, of Arkansas, is chairman, is busy with a grist of bills from which it is expected that the committee will report several with its indorsement. Chairman Oldfield favors some measure that will provide for an amendment of the law on the restrictive use of patents and a compulsory license clause to compel patentees to permit the public to use patented articles, to fix a reasonable price to any licensee, and for judicial settlement of disputes on that point.

Receiver Appointed for Gearless

INDIANAPOLIS, IND., April 8—E. W. Hoover has been appointed receiver for the Gearless Steering Device Company, of Indianapolis, by agreement of all of the parties concerned. It is possible that after the plaintiff has made further investigation, the case will be dropped. The suit for receiver was brought by Samuel Toole, a stockholder, who said he had been induced through misrepresentation to invest \$11,000 in the company. He sued for a receiver and judgment for \$15,000.

Republic—M. & W. Appeal Argued

Appeal from the decision of the United States District Court in the case of the Republic Rubber Company against Morgan & Wright, involving the validity of the Mell patent on staggard treads and the alleged infringement of the nobby tread manufactured by the defendant corporation, was argued before the United States Circuit Court of Appeals last week.

There was nothing specially new brought out in the presentation of the case, but the arguments were fully defined. In the ordinary course of court procedure the case will probably be decided late this month. The decision is of the utmost importance to the automobile trade on account of the broad construction which may be placed upon it. If sustained, the patent may be made the basis of suits aimed at a number of non-skid treads now on the market.

May Adjust Fisk—Auto Tire Suit

Suit instituted by the Fisk Rubber Company against the Auto Tire Company in the United States District Court will not be reached this month. In the meantime an effort is being made to bring the parties together. The suit is based upon the sale and delivery of about \$10,000 of casings and tubes for which payment is being withheld.

The Fisk company claims that the goods constituted a job lot and the defendant company asserts that some of the goods did not come up to specifications.

It was announced by Sidney Meyers, attorney for the plaintiff, that the differences between the parties were largely those of accounting and understanding.

Sell Old Jonz Plant

Court Authorizes Receiver to Dispose of Factory of American Automobile Manufacturing Company

Fisk vs. Auto Tire Company Suit May Be Adjusted—Gearless Receiver Appointed

LOUISVILLE, KY., April 8—At a meeting at the Hermit's Club the incorporators and organizers of the American Automobile Corporation, formed for the purpose of acquiring the plant and business of the American Automobile Manufacturing Company, of New Albany, Ind., perfected their organization by electing the following officers: President, L. A. Boli, Jr.; vice-president, Dr. George N. Little; secretary and treasurer, N. E. Jones. The following additional directors were chosen: Dr. F. P. Brockett, William Skillicorn, C. Charles Jones, E. O. Boli, Dr. J. W. Baxter, Charles Hayden, John F. Seger, Louis Bauer and Martin A. Seward.

The court has authorized the New Albany Trust Company, receiver of the American Automobile Manufacturing Company, to accept offers for the sale of the plant on or after April 20, which must be reported to the court in order to give the stockholders, creditors or others who may have an interest an opportunity to file objection to the sale. In case there is no valid objection the property will be sold.

It is believed that the American Automobile Corporation will be the only bidder and will purchase the plant of the American Automobile Manufacturing Company at a reasonable price and will continue the operation of the plant in New Albany. According to one of the directors of the former organization, no attempt will be made to place the Jonz vapor-cooled, two-cycle motor on the market, as the old concern had planned, but, should the American Automobile Corporation acquire the plant, he stated, the factory will be used to assemble pleasure cars and trucks equipped with water-cooled motors. Only a few of the parts will be manufactured at the New Albany plant.

By agreement of attorneys representing the various interests of the receivership of the American Automobile Manufacturing Company, the court will allow the claims of the employees for wages due.

Wilburine Against Wolverine

Answer has been filed in the suit of the Wilburine Oil Company vs. the Wolverine Lubricants Company in which infringement of the copyrighted trademark of the complainant is denied. It is also set up that the Wolverine company is not selling oil under the name of Wolverine at this time and has not done so for a number of weeks. The company is marketing its product under the old names of Packard and Bullshead, according to the answer.

The suit may be heard before vacation, but efforts are being made to bring the parties to an agreement to settle without recourse to a decree of court.

Claim Windshield Infringement

HARTFORD, CONN., April 6—The Holcomb company, of New Haven, which has a branch in Hartford, has been made the defendant in a suit brought in the United States district court by the Twentieth Century Motor Car and Supply Company, of South Bend, Ind., alleging that the defendant has infringed certain letters patent on a windshield for motor cars. The complainant company asked for an injunction and an accounting of the profits. The matter will be heard shortly.

N.A.A.M. Discusses Aspect of the Trade

Night-and-Day Work and Car Shortage Feature the Situation at Most of the Factories

**Velie Company Admitted--Sales Managers of Companies
to Meet in Convention--Imports Reduced**

MANUFACTURING conditions in the automobile industry were reflected in the views expressed by the manufacturers who attended the recent quarterly meetings of the Automobile Board of Trade and National Association of Automobile Manufacturers. The actual developments at both meetings were relatively small, but the trade talk was of the highest importance.

The Velie company came into the fold of the N. A. A. M. and it is stated that the Warren, already a member of the A. B. of T., the new King and the Federal truck would be lined up with the N. A. A. M. in the near future.

A call has been issued to assemble the sales managers of the various companies, together with as many of the other officers as possible, for a convention along the lines followed in the recent meeting of commercial vehicle makers, but treating of the pleasure car.

The merger joint committee reported progress.

The main topic under discussion at both meetings was the aspect of trade. The opinion was unanimously voiced that as far as manufacturing is concerned, the whole industry is under high pressure. Following are some of the opinions expressed:

W. C. Leland, representing Cadillac, Cartercar, Elmore, Marquette, Olds, Rapid and Reliance: "Business is rushing at the Cadillac factory, the storage capacity of our warehouses being over-filled. Shortage of freight cars has been a serious obstacle, but we are hopeful of better conditions in the immediate future. What applies to Cadillac also applies to the other companies in various degrees."

C. W. Nash, vice-president General Motors, representing Buick: "Great pressure is being placed upon the manufacturing facilities, and by much activity exerted in securing railroad transportation to market we have been able to move a relatively large number of automobiles. Within the past week the transportation situation has grown brighter, and that is all we are worrying about."

R. D. Chapin, Hudson: "The factory is working overtime to get out its April quota and, like all the rest, is finding its chief obstacle in the general lack of freight cars."

S. T. Davis, Jr., Locomobile: "The factory is working all day and half the night in an effort to keep step with business. Transportation to the distributing centers is not such a fierce problem with us as it is with some concerns, although we, too, are meeting with some exasperating delays. The company is pressing work in its commercial vehicle department."

W. E. Metzger, Everitt: "Work is being pushed in all the manufacturing departments of the company. The new six-cylinder model is going nicely. Railroad congestion does not seem to be quite so serious as it was recently."

George W. Bennett, Overland and Garford: "We are working hard in Ohio and praying for freight cars."

W. J. Coghlan, Moon: "The factory at St. Louis is under heavy pressure and sales for immediate and slightly deferred delivery are in greater volume than ever before, but it takes from 10 days to 3 weeks to deliver cars in New York by freight. We are being pushed for deliveries by customers and cannot get the cars on time. The normal time for shipments from

St. Louis to New York is 4 days. We have six carloads en route now."

G. E. Daniels, Oakland: "The season of 1912 will be the most important in the history of the factory so far. The output will be larger and the car will be more widely distributed than ever before. The factory is very busy."

Alfred Reeves, United States Motor Company: "Despite the late season, selling reached larger proportions at the normal spring date. Production will be on a larger scale than heretofore, although it is not likely that the present stage of factory activity will be maintained to the close of the manufacturing season."

Charles Clifton, Pierce-Arrow: "Business is excellent."

H. O. Smith, Premier: "We have no complaint to make about business except railroad transportation. The factory is very busy."

Windsor T. White, White: "No material complaint. The new six is showing up well. A week of warm sunshine and the railroad congestion will cure itself."

F. B. Stearns, Stearns: "We are rushing at the factory to fill the large orders for the new model."

C. S. Henshaw, Thomas: "Business in New York and vicinity is good. Aside from some delays in shipment, there is no reason for complaint."

Representatives of the Cunningham, Jackson, Knox, Lozier, Matheson, Marmon, National, Peerless, Reo, Selden and several others declare that the same general conditions obtain at their plants as are outlined above. In all, the manufacturing plants are busy and delivery is being hampered more or less by the railroad congestion.

Imports Cut in Half in 5 Years

WASHINGTON, D. C., April 8—For the fiscal year now approaching its close the total exports of motor cars and parts will approximate, if not exceed, \$25,000,000 in value. The imports of cars and parts are expected to reach a value of \$2,500,000. The import figure for 1912 will be much less than that of the fiscal year 1907, when the total was nearly \$5,000,000, thus indicating a marked decline in recent years in importations, though the growth of exportation during the same period has been very large.

Cameron Joins Universal Truck

DETROIT, MICH., April 8—W. H. Cameron, who recently resigned as chief engineer of the Overland, has joined the staff of the Universal Motor Truck Company, of Pontiac. Gossip to the effect that this means the construction of a six-cylinder pleasure car for W. E. Flanders, who is prominent in the Universal company, is declared to be groundless on good authorities.

Newman Heads Electric Company

CHICAGO, April 8—F. J. Newman, formerly chief engineer of the Woods Motor Vehicle Company, is president and general manager of the Chicago Electric Company, announcement of the formation of which has just been made. C. J. Blakeslee, also formerly on the Woods staff, is engineer of the new company. Alfred F. Leopold is secretary and Albert Meyer, treasurer.

A factory has been secured at Thirty-fifth and Morgan streets and the first car will be out June 1. One chassis, accommodating a variety of styles of bodies, will be built.

May Take Over Hart-Kraft Plant

YORK, PA., April 8—A \$200,000 corporation is about to be organized, it is said, to take over the Hart-Kraft Motor Company on North Duke street near the Northern Central railroad. The increased capital will be used to enlarge the factory. The Hart-

Kraft company was incorporated on February 1, 1907, with a capital of \$115,000. It went into the hands of a receiver more than a year ago. It is rumored that a syndicate composed of prominent capitalists who have associated with them a successful motor car manufacturer and a practical man from the Mercedes Motor Car Company, of Germany, have been looking over the property of the company with the view of purchasing the entire plant, with a plot of ground adjoining the present factory.

Henderson Car Will Soon Be Out

INDIANAPOLIS, IND., April 7—Plans for the building of the Henderson gasoline motor pleasure car have been completed and the first model will soon make its appearance. Chester S. Ricker, vice-president of the Indiana branch, Society of Automobile Engineers, will be the designer and mechanical engineer.

That the car will be built in Indianapolis is expected, although it is known that several outside cities have submitted flattering terms to locate with them. Thomas Biddle, representing a civic body of Toledo, O., was in Indianapolis and offered tempting inducements.

The new car will have a 116-inch wheelbase, self-starter and electric light equipment. Unique arrangements have been made for carrying compartments. The gasoline tank is to be peculiarly mounted.

The new company is now building three chasses in Indianapolis, each with different motors and parts.

Among the stockholders in the new company will be Charles P. Henderson, R. P. Henderson, Chester S. Ricker, L. Carter, of Jesup, Ga., and E. E. Rogers.

Pope-Hartford Ahead of Last Year

HARTFORD, CONN., April 5—An indication of the flourishing condition of the motor industry in the East is shown by the financial statement of the Pope-Hartford company and the readiness with which New York bankers advanced the company \$1,000,000 recently. The shipments up to January were \$350,000 in excess of a year ago for the same 5 months. The entire 1912 output has been sold and the company is now working upon its 1913 production. The substantial increase in the working capital made possible by the sale of its notes will allow the company to go into the market and purchase its materials at discount rates for cash, thereby adding to the value of the coming product.

General Motors Pays 4 1-2 Per Cent.

General Motors has declared a dividend of 4 1-2 per cent. on its preferred issues to stockholders of record April 15. The odd amount of the dividend is accounted for by the fact that the dividend date has been pushed forward 1 month because the interest payments on the \$15,000,000 loan fall due on April 1. The full dividend rate on the preferred stock is 7 per cent. per annum. The autumn dividend date was recently changed from October 1 to November 1, to correspond with the change in the spring arrangement.

Decision on Lock Washer Duties

WASHINGTON, D. C., April 7—In the case of United States vs. Motor Car Equipment Company, involving the dutiable classification of lock washers, the United States court of customs appeals made the following ruling: "The authorities concur in the conclusion that lock washers or nut locks, intended for use on motor cars, are an evolution of the common washer, and they are properly to be designated 'washers.' The importation is dutiable as such under paragraph 162, tariff act of 1909, at the rate of three-fourths of 1 cent per pound, and not as manufactures of steel not specially provided for, under paragraph 199, at the rate of 45 per cent. ad valorem."

Detroit's Freight Car Shortage at an End

Shipping Conditions Are Now Almost Normal—First Henderson Car Will Soon Put in an Appearance

General Motors Pays a Dividend of 4 1-2 Per Cent.—Morgan & Wright Buy Oldsmobile Plant

DETROIT, MICH., April 8—Freight conditions have improved 50 per cent. since April 1 and the number of automobiles stored since the freight car famine began, has been so reduced as to amount to a merely negligible quantity. The Cadillac shipped 616 cars during the week ending April 13, averaging better than 100 cars for each working day. This greatly relieved the pressure in this factory, where conditions had been such that cars had been stored for weeks in the streets about the factory. The Ford factory averaged shipments of between 200 and 300 cars daily.

To guard against the conditions which prevailed through the winter, several of the railroads have ordered large quantities of automobile cars, which will be available in a few months. Double-decking has come to be a regular feature of automobile shipments and the latest models of freight cars are equipped with sockets which can be used for this purpose, relieving the shipping departments of the factories from the present necessity of building an entire upper deck. Cars shipped in this way have the wheels removed. This process allows shipment of as many as eight automobiles in a carload, provided the automobiles are not of the extremely long type.

M. & W. Get Old Oldsmobile Plant

DETROIT, MICH., April 8—Morgan & Wright have acquired the old Oldsmobile plant, adjoining the tire firm's big factory. This is the plant from which the pioneer Detroit automobile manufacturers produced the famous curve-dash runabouts. More recently the plant has been the manufacturing headquarters of the Welch-Detroit company, which was recently merged with the Marquette company, of Saginaw. The Welch-Detroit company still retains part of the building.

Market Changes for the Week

Activity was small in the metal market for the week closing yesterday, which was due principally to the Easter holidays during which trading was suspended in London. The price of copper remained practically unchanged.

After having remained at 4.30 for some time, lead declined to 4.20 in Tuesday's market. Tin advanced steadily since Sunday, owing to the advance of London prices. There have recently arrived 2,835 tons of this metal and 2,260 tons are still in transit.

Crude rubber had a rather dull week all told. The fluctuations were narrow but the trend was upward. Sales were made up to \$1.17 1-2 a pound, but volume of business was small, particularly for the better grades. Advices from London are that trading is firmer since the market reopened after the holidays. The scrap rubber market is as steady as it has been for a number of weeks, as the demand is strong enough to absorb whatever material is offered for sale. Automobile tire scrap was bid 8 3-4, ask 8 7-8 cents per pound. The following table shows the daily changes for the week:

| Material | Wed. | Thurs. | Fri. | Sat. | Mon. | Tues. | Week's Change |
|-------------------------------|------|--------|------|------|------|-------|---------------|
| Copper, p. lb. | .15¾ | .15¾ | .15¾ | .15¾ | .15¾ | .15¾ | ..... |
| Lead, p. 100 lb. | 4.30 | 4.30 | 4.30 | 4.30 | 4.30 | 4.20 | —10 |
| Rubber, p. lb. up-river Para. | 1.18 | 1.17 | 1.17 | 1.17 | 1.17 | 1.17 | —01 |
| Tin, p. lb... | .43¾ | .43 | .43 | .43 | .43¾ | .43¾ | +00½ |

Makers Cut Tire Prices 10 Per Cent.

Goodrich Started the Slash and All the Others Have Met the Reduction or Are Preparing to Do So

Cheap Rubber and Abandonment of Retail Field by United States Company Among the Causes

TIRE prices received a jolt this week when most of the standard makes were sharply reduced to the consumer. Goodrich cut first and deepest as the opening of a campaign against dealers who have made a practice of giving concessions to customers from the published list prices.

The Goodrich cut represents a reduction to consumers of about 5 per cent. below the published list prices to preferred jobbers, effective prior to January 1, 1912. In other words, Goodrich tires can now be purchased by consumers at 5 per cent. less than preferred jobbers had to pay for them before the reduction of 10 per cent. which was announced in these columns during the Madison Square Garden show.

The Fisk Rubber Company has issued a new list of prices by which the cost of Fisk tubes is raised 10 per cent. and those of Dunlop tubes 15 per cent. and raising the price of 3-inch casings to the level held prior to the announced cut last winter. The new list of the Fisk company in all other respects merely amends the old list, in force before the first of the year, to conform with the 10 per cent. cut announced at the show.

The United States Tire Company, which abandoned retail selling this spring, has formulated a new list of prices to the consumer. This is 10 per cent. less than the prices in force according to the printed lists of last fall. This does not mean that the company will re-enter the retail field.

The Diamond company has reduced consumers' prices 10 per cent. Goodyear has made no announcement to date but is expected to take some action in the immediate future.

Practically all the other companies are preparing to change their price lists, but the details of the changes have not been made public.

The movement represents several factors. First, the generally lower level of crude rubber prices, in comparison with those current in July last year when the old list was made up. Second, the adjustment of jobbers' and consumers' prices so as to eliminate a portion of the nominal margin of profit, and third, the abandonment of the retail field by the United States Tire Company and the assumption of that line by the B. F. Goodrich company made some additional moves imperative.

Some Causes of the Reduction

Rubber prices are materially lower than they were last summer, although the current level is about 20 cents a pound above rock-bottom. Figuring on a margin of 30 cents a pound, the difference represented by the cut is not dissimilar to the saving on crude rubber.

But the second factor mentioned above is most important. When the reductions were announced to jobbers and dealers last winter, it was freely stated that the consumers would eventually get the benefit. Some of the companies had been complaining that the cut-rate jobbers and dealers were in the habit of selling at less than published consumers' rates and that the practice had become so widespread that the actual market price of tires had been reduced to approximately 5 per cent. of the price to dealers. This involved loss of trade to the dealers who maintained prices and resulted in a large trade at very small profit to the dealers who met the reductions to consumers or originated them.

After the reduction last winter in the jobbers' prices, the nominal margin of profit was 20 per cent. Actually, it was not far from 14 per cent. But the tire makers discovered that the dealers were giving their customers a portion of the additional 10 per cent., and, to clear the situation, it was decided to reduce the consumers' prices to correspond with the reduction to the jobbers.

The B. F. Goodrich company, however, has gone a step further. It has frankly and openly chopped about 15 per cent. horizontally from every item on its tire list. Just as frankly and openly it has announced that the move has been made to discourage unofficial price-cutting by reducing the nominal margin of profit to 5 per cent.

In all cases, the nominal level of dealers' prices remains as it was after the January cut, although in some cases the large jobbers can probably get equitable trade concessions.

Taking the standard casing 34 by 4 inches, the new prices to the consumer so far as they have been announced are as follows: Goodrich, \$31.30; Fisk, \$33.60; United States, \$33.60; Diamond, \$33.60.

Following is a tabulation showing the new prices quoted by the Goodrich company to consumers, effective April 8:

| Size | Regular Q. D. or Straight Bead Smooth Case | Regular Q. D. or Straight Bead Bailey Case | Q. D. Master Tread Case | All Tubes |
|----------|--|--|-------------------------|-----------|
| 26x3 | \$11.65 | \$12.95 | ..... | \$2.75 |
| 28x3 | 12.60 | 13.95 | ..... | 2.95 |
| 30x3 | 13.50 | 14.70 | ..... | 3.20 |
| 32x3 | 14.40 | 15.60 | ..... | 3.40 |
| 34x3 | 15.25 | 16.55 | ..... | 3.65 |
| 36x3 | 16.25 | 17.60 | ..... | 3.80 |
| 28x3 1/2 | 16.00 | 17.60 | ..... | 3.85 |
| 28x3 1/2 | 18.50 | 20.20 | \$22.20 | 4.05 |
| 29x3 1/2 | 19.15 | 20.90 | 23.00 | 4.20 |
| 30x3 1/2 | 19.85 | 21.60 | 23.80 | 4.30 |
| 31x3 1/2 | 20.55 | 22.20 | 24.50 | 4.40 |
| 32x3 1/2 | 21.20 | 22.95 | 25.20 | 4.50 |
| 33x3 1/2 | 22.05 | 23.85 | 26.25 | 4.70 |
| 34x3 1/2 | 23.05 | 24.80 | 27.30 | 4.80 |
| 35x3 1/2 | 24.00 | 25.75 | 28.35 | 4.90 |
| 36x3 1/2 | 24.95 | 26.70 | 29.35 | 5.05 |
| 30x4 | 27.20 | 29.45 | 32.40 | 5.30 |
| 31x4 | 28.25 | 30.45 | 33.45 | 5.45 |
| 32x4 | 29.25 | 31.45 | 34.65 | 5.55 |
| 33x4 | 30.30 | 32.55 | 35.80 | 5.80 |
| 34x4 | 31.30 | 33.40 | 36.75 | 5.95 |
| 35x4 | 32.30 | 34.45 | 37.90 | 6.05 |
| 36x4 | 33.35 | 35.55 | 39.05 | 6.25 |
| 37x4 | 34.30 | 36.50 | 40.10 | 6.35 |
| 38x4 | 35.35 | 37.60 | 41.35 | 6.50 |
| 40x4 | 37.35 | 39.65 | 43.65 | 6.90 |
| 42x4 | 39.45 | 41.60 | 45.75 | 7.20 |

The Tire Situation in Chicago

CHICAGO, April 8—Fighting the price-cutter with the most effective weapon—bringing the prices down till the margin of profit is so small as to discourage those concerns which make a practice of slashing—is the reason given by tire men for the general reduction that went into effect this week. The new prices favor the consumer more than the dealer, which is the aim of the rubber men, who want the prices so low as to discourage the practice of some owners in buying from concerns which cut prices. The dealer also comes in for recognition, but not to so great an extent. In the main, it might be said that the new prices put the consumer on the same footing as the dealer who was the one to profit when the prices dropped at show time.

Here in Chicago the Goodrich fired an advertising gun Sunday when it announced a reduction which practically means a 17 per cent. drop for the owner and about 10 per cent. for the dealer. For instance, a 34 by 4-inch Goodyear that formerly was bought by the consumer for \$37.75 he may now purchase for only \$31.30, or at a saving of \$6.45.

Fisk has a new rate card which goes into effect Wednesday, but just how much it differs from the old one is not stated as yet. It is said, though, that the consumer gets the long end of it. Diamond put its new rate into effect on Saturday, but did not advertise it. As with the others, Diamond hopes that the reduced prices will protect the dealer who is fighting for his legitimate profit against the price-cutting of others.

Lack of Freight Cars Handicapped Industry

**Delays Increased Time of Shipments 400
Per Cent.—Four Weeks to Ship
from Detroit to New York**

**Many Companies Resorted to Express Service During
Shortage Despite Greatly Increased Cost**

SHORTAGE of freight cars has been the most serious drawback of 1912, as far as the automobile industry is concerned. Fortunately the worst is over in this respect and from now on the supply of freight cars is expected to grow more and more plentiful to the finish of the present shipping season.

The normal elapsed time for shipments in either direction between New York and Chicago is 60 hours, but the average time for such shipments from January 1 to April 1, 1912, was slightly in excess of 10 days. The average normal time between Detroit and New York is 55 hours, and from Indianapolis and Toledo and New York, is practically the same. In numerous instances this season it has required as much as 4 weeks to complete shipments.

The railroad statisticians reported in the latter part of March that for the first time in the history of railroading there were no idle freight cars.

At first glance it would seem that there must be a tremendous pressure of new business in addition to the normal volume of traffic, but the general trade reports show that the increase is only nominal in comparison with other years.

Reports from the automobile industry compiled and published in *THE AUTOMOBILE* recently, show that there has been a large increase in that branch of manufacture, but the increase is not so tremendous as to congest all the railway lines in the United States with new business. The situation at Detroit, Toledo and Indianapolis, and to some extent at Cincinnati, is distinctly congested. According to James S. Marvin, assistant general manager of the N. A. A. M., one of the biggest of the Detroit factories has been obliged to store its newly assembled cars in the streets, awaiting freight cars with which to transport the product to the centers of distribution, while three others have completely filled their storage warehouses and will be forced to follow the same procedure, unless the car supply improves. Practically every maker in the Detroit field is carrying an abnormal number of finished automobiles, simply because of the impossibility of delivering them to distributors, who in practically every instance have sold the cars to customers.

Congestion Was Due to Weather

The actual movement of automobiles from factories to consumers is less than it was last year, while the manufacturers have put out many more cars and dealers and agents have taken deposits on a largely increased number.

Carried to its final analysis, lack of shipping facilities can cripple production in any industry, with all that such a condition may mean to the corporations and firms belonging to it.

Taking Mr. Marvin as authority, the situation is not so bad now as it was last week and it will probably be considerably improved by next week. The present season of the year is not subject under normal conditions to extraordinary pressure of shipping. The movement of grain should have been concluded, as a major factor, by February 1 and the lumber season is not yet applying very heavy pressure. Therefore the increase in automobile demands should not cause any nation-wide car shortage.

Mr. Marvin explains the situation as follows:

"Reduced efficiency of the railroads, due to the long, cold, hard, winter is the reason for the present freight congestion. The general demand for shipping facilities is only a trifle larger than it was last year, when there was no marked congestion.

"The normal time for fast freight between New York and Chicago is 60 hours, or 2 1-2 days, and under present conditions it takes 10 days or more for the same job. If it required only 60 hours last year and 10 days this year, it is apparent that the shipping needs of 1912 would call for four times as many cars as they did in 1911. As such a volume of traffic is unbelievable with present equipment, the conclusion must be drawn that the actual volume of general freight being handled this year is less than it was last, despite the fact that all the hundreds of thousands of surplus freight cars are now in service.

"The past winter was of extraordinary severity and caused much delay in shipments. The spring was late, 5 inches of snow falling at Cleveland only last week. The result is to be seen in the present situation.

"Several of the manufacturing companies have resorted to express service for emergency business. The difference in cost is a material item. For instance, the rate from the factory to New York by freight in carload lots is \$64, based upon a minimum weight of 10,000 pounds. The average automobile freight car is 8 feet wide, which is too narrow to accommodate any but the smallest size of car placed sidewise. The average-sized automobile will go about two to the car and if they weigh 6,000 pounds, the minimum rate of \$64 will be assessed. If three cars can be arranged in the railroad car, the same rate would apply, because the gross weight would not reach 10,000 pounds.

Comparing Freight and Express

"The express rate for the same service is \$200 a car, based upon a minimum weight of 10,000 pounds. The express car is of the same width as the ordinary automobile freight car, but is much longer. It would be quite possible to ship five automobiles of moderate size, say 12 feet overall, in a single car. These automobiles would be of the size and type of which three would go into the freight car. The actual weight of one type is 2,116 pounds per unit. Thus by freight the transportation charge would be \$21.34 per car. The actual weight of the express shipment would be 10,580 pounds, making the gross express charge \$212, or \$42.40 per unit. Of course, where only two cars can be shipped by freight and three by express, the rate per unit would be \$32 and \$66.67 respectively.

"The express rate, therefore, is approximately double that of ordinary freight shipment, as far as automobiles are concerned.

"One car doing the work of four, as at present, is an attractive proposition from the viewpoint of the roads because it can be handled with one-quarter of the operating expense that is required for the four."

Says Callan Law Is Unconstitutional

BUFFALO, N. Y., April 9—During the past week arguments were heard by Judge Taylor in county court on the appeal of Theodore P. Meinhardt, chauffeur, from his conviction and fine of \$5 in city court for failing to secure a chauffeur's license. Charles J. Staples appeared for the chauffeur and Assistant District-Attorney McLaughlin for the State. Mr. Staples declared that the Callan law's provisions requiring chauffeurs to take out a license is class legislation and is unconstitutional. Attorney Staples asserted that all the chauffeurs in Buffalo are awaiting a decision in this case because it is the first attack in the courts on the license provision of the Callan law. He argued that 90 per cent. of automobile accidents are due to the reckless and careless driving of inexperienced owners and their sons and daughters. "And yet none of these is required to take out a license," stated Attorney Staples. "It is this fact that makes the class discrimination I complain of and which in my judgment renders the law unconstitutional." Judge Taylor reserved decision.

Milwaukee Lands Race

Awarded by Formal Action of Motor Cups Holding Association—To Be Run Between October 1 and 15

Only Bad Weather Will Prevent Running of 400-Mile Sweepstake on Decoration Day

MILWAUKEE was awarded the Grand Prize and Vanderbilt Cup races of 1912 by formal action taken by the Motor Cups Holding Association Tuesday. The award is conditioned upon sanction for the running of the Grand Prize by the Automobile Club of America and for the Vanderbilt Cup, by the American Automobile Association.

The Milwaukee Automobile Dealers' Association has obtained assurances of the donation of two other international trophies, to be competed for during the running of the Vanderbilt and Grand Prix, as is customary. One of these trophies will be known as the Milwaukee Challenge Cup, and will be hung up by the combined business associations of Milwaukee. The other will be a trophy of practically equal value with the two principal trophies, and will be hung up by a prominent Milwaukee business man, whose name is withheld. The donor, however is believed to be Colonel Gustav Pabst, head of the vast Pabst brewery interest, and one of the most enthusiastic backers of the M. A. D. A. in the venture.

The races will be held between August 15 and October 15, and presumably near the latter date. Wisconsin climate will not permit of the running of races later than October 15 or November 1, as the temperatures generally are low during this period and the precipitation rather heavy. It is, therefore, expected that the races will be held between October 1 and 15.

The Trade Association held a meeting Tuesday night to organize for the speed tourney and to raise the necessary funds. The dealers have guaranteed \$5,000 and the balance of \$50,000 is expected to be contributed by citizens and local organizations. Milwaukee's mayor is chairman of a general executive committee appointed for the purpose of raising this money. The State Highway Commission has volunteered to superintend the improvement of the course and the township supervisors have promised co-operation and the use of \$10,000 worth of road building machinery recently purchased.

Weather Only to Stop Sweepstake

INDIANAPOLIS, IND., April 8—A Marquette-Buick 100 will be seen in action in the second annual 500-mile International Sweepstakes race at the Motor Speedway next Memorial Day, May 30. The car was entered by William Thomson, of Battle Creek, Mich., a wealthy newspaper publisher and sportsman, and will be driven by Billy Liesaw of the same city.

From some unknown source rumors have arisen to the effect that the 500-mile race was to be postponed. It is given out by the Speedway management that the race positively will not be postponed for any reason whatever, except that in event of bad weather the contest will be held over two days or until Saturday, June 1.

President May Set Secret Time

WASHINGTON, D. C., April 6—A sociability run is being organized by the Automobile Club of Washington. It will be run May 18 and the indications are 300 machines will be in line, as the entries are coming in fast. The run will start at the Capitol and the route will be through the heart of the city, out the

Conduit road to the Anglers' Club, where the contestants will turn and proceed back to the city and thence to the club's country home on Georgia avenue. It is planned to have President Taft or Vice-president Sherman set the secret time for the run.

Two Classes in Quaker City Run

PHILADELPHIA, April 8—The enactment of the Stickel automobile reciprocity bill in New Jersey granting non-residents the 15-day touring privilege without registering or filing a power of attorney has accelerated interest in the sixth annual sociability run of the Quaker City Motor Club to Atlantic City and return on Saturday, April 27, plans for which were held in abeyance pending the final outcome of the measure.

The rules governing this year's event mark a departure over those prevailing in former years in that entrants will compete for prizes in two classes, namely, average time and fuel economy—the latter feature for water-cooled cars.

Long Government Test for Trucks

LACROSSE, WIS., April 7—Word has been received at LaCrosse, Wis., that the war department is to conduct a severe test to determine the introduction of the motor truck and the abolition of the army mule. A run will be made from Washington, D. C., to Sparta, Wis., near LaCrosse, and the station of the United States military reservation of the Northwest.

Denver-New York Sociability Run

DENVER, COL., April 8—The Denver Chamber of Commerce is planning a sociability run from Denver to New York that is said to be the first organized tour which will take any considerable number of machines in an eastward direction. This run was planned to take place last fall, but the season was too far advanced before the arrangements were completed and it was postponed. Assistant Secretary Kittredge, of the Chamber, says that Denver motorists are manifesting a lively interest in the project and that already he is sure that 30 cars will be entered by private owners and dealers. The route from Omaha will include Chicago, Cleveland, Buffalo and Albany.

State and Nation Clash on License

MADISON, WIS., April 7—An interesting question as to federal rights with regard to the operation of motor cars without state registration and license is to be settled by the courts soon. L. M. Compton, superintendent of the government Indian school at Tomah, Wis., recently applied to the Wisconsin secretary of state for registration and license without cost on the claim that the car is to be used exclusively in federal service. The secretary of state refused to issue the license unless the customary fee of \$5 was paid. F. H. Abbott, assistant commissioner of Indian affairs at Washington, has ordered Mr. Compton to operate the car without a license in the premises, and the police authorities of Tomah have been ordered to enforce the law requiring every car operated in Wisconsin to be registered and bear license tags.

Congress to Decide District Tax

WASHINGTON, D. C., April 7—The only hope for relief of motor car owners from the wheel tax law lies in an appeal to Congress, is the opinion given by Judge James L. Pugh, in the district branch of the police court. The cases set for trial today before Judge Pugh of motorists who refused to pay the tax have been postponed until April 17. B. M. Clinedinst will be the defendant in the test case to be made. Five prominent attorneys are identified with the movement to annul the wheel tax law and it is expected that a vigorous fight will be made when the case comes to trial.

Long-Stroke Engine Talk

J. B. Entz, of the White Company, Discusses This Type of Motor Before Cleveland Engineering Society

Demonstrates How Bore-Stroke Ratio Affects Thermal Efficiency

THE long-stroke engine is attracting much attention at the present time, many of the advanced arguments in its favor being greater power, flexibility and economy as compared with engines having equal bore, but shorter stroke. Some of the reasons for increase in these respects, according to J. B. Entz, of the White company, who addressed the Cleveland Engineering Society on this subject recently, are:

"A 4 1-2 by 4 1-2-inch engine is of the same cylinder volume as a 4-inch bore by 5 3-4-inch stroke, but it has an area of piston head 26 per cent. greater. If, during the waiting stroke, the pressure per square inch were the same in each case, the total pressure would be 26 per cent. greater, but you would get no greater turning effort as the crank on which it acts is proportionately shorter. The loss in the crankshaft bearing is, however, increased, due to the greater pressure on them and the fact that the crankpins and mainshaft bearings turn in their boxes but once per revolution, whether the stroke be long or short. The side pressure of the pistons on the cylinder walls is also greater, due to the greater pressure on the larger piston head in the short-stroke motor. The result is a higher mechanical efficiency for the long-stroke motor, as it has less internal friction. The piston weight and connecting-rod weight is less in the long-stroke motor, due to the small size of the piston and less pressure on it.

"The wall area of the compression space is less in the long-stroke motor because of its shape, and the heat units lost are therefore less. The long-stroke motor has, therefore, a higher thermal, or heat, efficiency than the short-stroke, and, as the thermal efficiency is lowest at low speeds, the long-stroke motor pulls better at low speeds.

"The extent to which the cylinder is filled on the suction stroke is not determined by the speed of the gases in the cylinder as they follow the piston on its down stroke, but by the very much higher speed through the carbureter, inlet passages and valves, which is the same in the case of both engines. Also the rate of expansion of the gas on the working stroke after it has been ignited is not different in the two engines, as in each case the expansion is from the volume contained in the compression chamber to the total volume of the cylinder and this takes place in the same length of time at the same number of revolutions per minute.

"The best relation of stroke to bore, or most practical relation, according to the latest practice in Europe and this country, is a stroke 1.4 to 1.5 bore, although engines have been built with a stroke more than twice the bore. It may be interesting to show how the valves open in relation to the position of the piston and the piston speed at different points in the stroke, although this is not necessarily different in the long and short-stroke engine.

"Fig. 1 is a card taken from an engine with an indicator made for that purpose. The exhaust valve opens about 45 degrees before the piston reaches the lower center, which in this case was 3-4 inch on a 6 1-2-inch stroke.

"It will be noticed that as the piston movement is slowest around its lowest center, the valve is half open or more at the lowest center or finish of the power stroke, although it did not commence to open until the power stroke was prac-

tically finished. The exhaust valve opens very rapidly at first in relation to the piston movement, as it should, to permit the easy escape of the exhaust gases. The exhaust valve closes a little past the top center, about 5 degrees, which corresponds to a very small downward movement of the piston on the suction stroke. The inlet valve opens a few degrees after the exhaust closes, and as it opens after the piston passes top center, its opening is not nearly so rapid in respect to piston movement as was the opening of the exhaust valve, which started before lower center was reached.

"The dotted line shows the piston speed at different points of the stroke. It is higher near the top center than the bottom center on account of the angularity of the connecting-rod. It will be noticed that the inlet valve opening is smaller in proportion to the piston speed at the beginning of the suction stroke than it is on the last part of the stroke, where it is wide open after the piston speed has commenced to decrease. This is as it should be, as although the piston movement is the actuating force that moves the air and draws it into the cylinder, yet the inertia of the air causes it to lag behind at the first part of the stroke and after it has obtained velocity and momentum it continues to enter the cylinder even when the piston has reached the end of the stroke and for some distance on the upward stroke. The higher the speed of the engine, the more the advantage in the late closing of the inlet valve. But the closing shown is very good as the valve is half open at the end of the stroke and is closed when the piston has moved 1-2 inch upward on the compression stroke, thus not permitting of much loss of the charge even at slow speeds.

Proportions of Air and Gasoline

"The theoretical amount of air to combine with the gasoline is about 15 1-2 to 1 by weight, but in practice the best mixtures are about 20 to 1. As the vacuum in the carbureter is the force that acts upon both the gasoline and the air, and as the velocity which will be imparted to either is inversely as the square root of their mass or weight it follows that as gasoline at 60 degrees Fahrenheit weighs about 580 times air, at the same temperature, its velocity when leaving the nozzle is inversely as the square root of 580, or 1-24, the velocity of the air in the tube around the nozzle. So that if we had a single gasoline nozzle, in a single air tube, through which all the air passed, and the air tube was 1 inch in diameter and the gasoline nozzle was 1-20 inch, then the quantity of air by weight compared with the gasoline would be, first, 400 times, because of 400 times the area, multiplied by 24, because of 24 times the speed, and divided by 580, because of 1-580 the weight. This equals sixteen and one-half times the weight of air to gasoline. As the gasoline leaves the nozzle it becomes finally divided and is carried along with the air at an increasing rate of speed until it would reach the same speed as the air or until it combines with it to form a gas. I mention this fact of the very much slower speed of the gasoline as compared to the air into which it first enters, as many believe that the gasoline impinges upon the air like water from a nozzle upon stationary air."

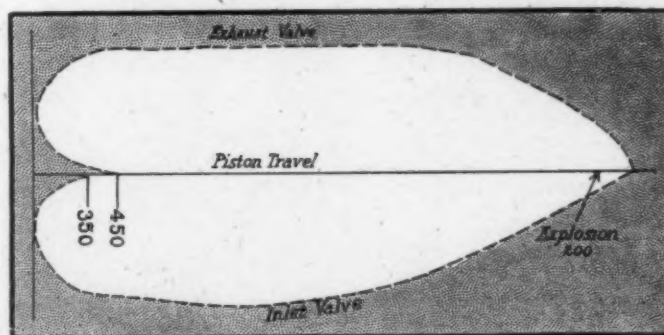


Fig. 1—Indicator card showing how the valves open in relation to the motion of the piston.

Georgia's Roads Are Magnificent



The road south of Macon seems like a highway in Central New Jersey

GEOORGIA, territorially the biggest state east of the Mississippi river, contains 392.1 miles of the main highway from New York to Jacksonville. Georgia represents in many ways the most advanced spirit of the new South. It requires at least two days to cross the state by way of the road followed in the recent Glidden Tour, and the trip would be more comfortable if 2 1-2 days should be devoted to the journey.

The state has made much progress in road building during the past five years, and within the last two years the activity in constructing highways has been notable.

Geographically, the state is divided into three general sections. Upper Georgia, lying on the northern side of the state, contains about 10,000 square miles of the Appalachian mountains and their foothills. This region extends southward from the Tennessee line almost to Atlanta, ending abruptly with the beginning of the section known as middle Georgia. This is the hill section of the state and includes 15,000 square miles of territory, extending from the falls of the rivers to the plateau which marks the beginning of lower Georgia. This is by far the largest section and includes, aside from the plateau, the swamp belt and the sea islands, all told practically 35,000 square miles.

Middle Georgia, which for generations prior to 1890 was considered one of the finest agricultural sections of the world, became impoverished from continued and unscientific cultivation of cotton and for a decade degenerated rapidly. However, during the past ten years intelligent fertilization has reclaimed much of this garden territory and today it is yielding bountifully.

Upper Georgia is broken and hilly, containing a few peaks about 1 mile high and presenting delightful scenic effects, while lower Georgia with its



Map showing how the New York-Jacksonville highway traverses Georgia

mysterious, impenetrable wastes and jungles, such as the Okefinokee swamp, and the lands fronting on the sea island coast, holds out many attractions for the tourist.

Roads Worse the Farther South

The mountain trails of the upper section of Georgia are like those of any other mountainous state. Through the intermediate section the roads are generally good clear beyond Macon. But south from Valdosta to the Florida state line there is an abundance of heavy sand and unimproved roads.

Atlanta, the largest city in the state, is called the New York of the South.

The New York-Jacksonville highway enters the state over the Knox bridge, spanning the Tugaloo river. From there to Commerce, a distance of 37.3 miles, the road traverses a rolling country, with the mountains in sight a good part of the time. Some of the grades are pretty stiff, but the highway has been well graded and is surfaced with the red, native clay containing an admixture of sand. This road is almost like a boulevard after a short dry spell and is not really bad in wet weather. It passes through Lavonia, Carnesville and one stretch of about 3 miles of rough going 9 miles north of Commerce before reaching that interesting city. Except for this rough spot the road is excellent.

Grading is the chief line of improve-



Grading machine at work on south end of Macon boulevard



Through stately aisles of turpentine pines, 6 miles from Valdosta

ment that has been followed in building Georgia roads. There are some wonderfully good boulevards in the central part of the state, but even more important to the automobile tourist than these are the smooth, wide, graded country roads to be found elsewhere.

Atlanta Is a City of Trees

From Commerce to Atlanta the road passes through pine woods for many miles, touching the following towns and cities: Jefferson, Winder, Auburn, Duluth, Pittman, Norcross, Doraville, Folsom Park and Buckhead. This section of the road is 79.7 miles long. Except for about 20 miles north of Duluth through the pine woods, it is substantially graded and easy to travel. The unimproved stretch is mostly level and has some sandy spots which are difficult after a long dry spell.

Atlanta, the commercial metropolis of the South, is a city built in a forest. Looking down upon it from one of the tall buildings little can be seen of the dwellings on account of the rich, thick verdure of the trees which are present everywhere. The community is progressive in every phase of meaning of which the term is capable. In agriculture, manufacture and transportation, Atlanta is acknowledged to be the queen city of the section. When the Glidden Tour reached Atlanta, the caravan was welcomed by a host of privately owned automobiles, said to have numbered 1,500. Such a collec-



State Is an Ideal Touring Ground



New bridge that replaces shaky present structure south of Valdosta

tion of cars in a city of the size of Atlanta proves conclusively that the city is rich and progressive.

To the road-worn tourist who has suffered pangs of anguish at every stop south of Winston-Salem, the hotels of Atlanta are delightful. They are equal in accommodations to hotels of any other city in the country.

The New York-Jacksonville highway enters Atlanta over a fine macadamized road, an extension of Peachtree street, the main street of the city. Leaving this place the paved road extends about 12 miles, passing Fort McPherson and College Park. Then there is sandy road for 7 miles, followed by the typical graded country road of Georgia. This touches Fayetteville, Inman, Woolsey, Lowry, where some rough going will be experienced for a mile or so, and after passing the Flint river, proceeds into Griffin by the way of Esmond. This is 46.8 miles south of Atlanta.

From Griffin to Macon the road is a delight. The red clay seems to have changed in character near Griffin, and while it may still be classed as red clay, it looks yellow and contains much sand. The road is about as good as rock-based macadam and is practically level for miles at a stretch. Road-building gangs of convicts have cut down the grades and smoothed the surface until automobile riding over this highway is a complete pleasure.

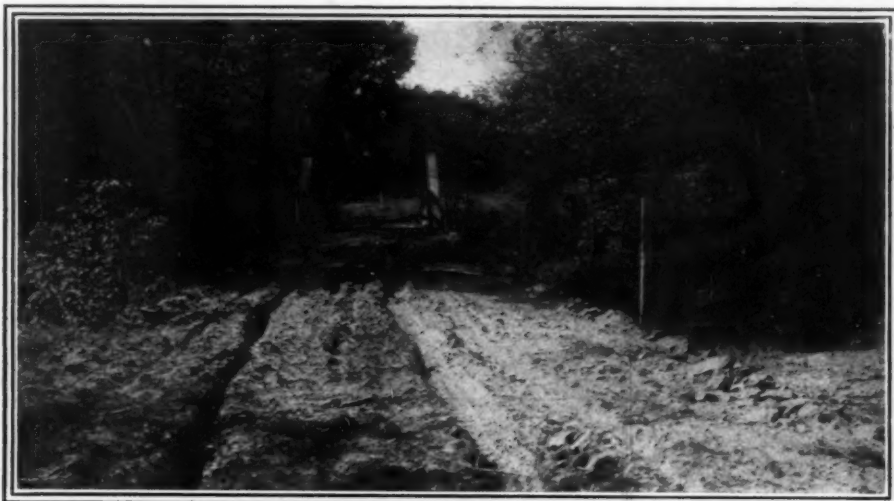
The road follows the railroad right-of-way to Orchard Hill, Milner, Barnesville, Forsyth, Smarrs and Bolingbroke to Macon. There is not a whole mile of fair road in the 56.8 miles from Griffin to Macon. It is all excellent.

Macon is a big country town which has lately come to life suddenly. In some respects it is typical of the Old South, with all its conservatism. In another view Macon is distinctly progressive, this being evidenced by the pride of its citizens in the good roads.



On both sides of Griffin the roads are smooth and parallel the railroad

Three Stages in Road Building as Seen Through the State of Georgia, Running the Full Gamut



Bridge and poor road 10 miles out of Atlanta. Such scenes are unusual anywhere in Georgia and these conditions are being rapidly corrected



Near Fayetteville, showing road and scraping scoops used in its making. This stretch of highway is somewhat loose on the surface



This looks like macadam, but it is only another sample of the Macon boulevard

Passing south from Macon the road crosses the Causeway swamp, as mysterious a section of the tour as could be wished. For the first time on the trip south the Spanish moss is seen hanging dismally from the tall cypress trees. The swamp is crossed by a series of substantial wooden causeways. In the night a trip over this section of the road is fearsome. If the car is halted upon one of the causeways and everybody keeps silent for a few minutes the voices of the night may be heard. The gutturals of bruin and the shrill screeching of the wild-cat make a wild harmony for the obbligate of the swamp birds.

Mostly Dirt Roads

Leaving the swamp the clay is also left behind and from Macon to Cordele the roads are largely of graded dirt. Some of these are excellent for miles and the whole road proves that Georgia is fully alive to the value of highway improvement. On the way to Cordele the course is through a sparsely-settled country, touching only the towns of Perry, Henderson and Vienna in 64.2 miles.

Cordele is a cotton town and the plantations that surround it are usually of considerable size. It is richer in proportion to its population than most of the other Georgia cities. This fact is demonstrated by the fact that the chief dealer and handler of automobiles in Cordele has sold 63 cars of high price and grade and all of one make to his customers nearby. These are cars selling for about \$4,000.

From Cordele to the Florida line the highway runs the full gamut of road possibilities. To Tifton the roads are good Georgia roads. From Tifton to Valdosta the roads are graded all the way but are not as good as they are further north. South of Valdosta they are heavy and sandy with poor bridges.

Of the 392.1 miles of the New York-Jacksonville highway included in Georgia

100 miles is macadam or better than macadam. Of the remainder, 250 miles is carefully graded sand-clay or dirt highway and 40 miles is either unimproved road through the woods and sand, or rough spots that lie between good stretches of state road.

The road is almost new and represents one stage in the development that is being carried on by the state. In five years, according to present plans, the road as it exists to-day would be considered the worst road in the state.

Except for the hospitable city of Atlanta, Georgia is in quite as bad a hole as far as hotels are concerned as any of her sister states.

It would be unjust under present hotel conditions for an automobilist of wealth and social position to take his family through Georgia or any other state nearby if they were dependent upon the hotels for accommodations. With the possible exception of Macon, there is not a city outside Atlanta in the whole state that has a hotel which would rate as fourth-class in New York. That polite fiction dealing with what is termed southern hospitality is just plain fiction.

Better Times Coming

The people of the state are aware of the existing flaws in touring conditions that obtain in their own state as well as throughout the South. They realize more strongly than outsiders the necessity for good hotels and it is freely admitted by them that their accommodations for travelers are not what they should be.

They declare that changes are being made all the time and they promise that in the course of a year or so, Georgia shall have good hotels outside of Atlanta.

But after all the road conditions show better than anything else the attitude of Georgia toward the automobile. Progressiveness is the keystone of Georgia.

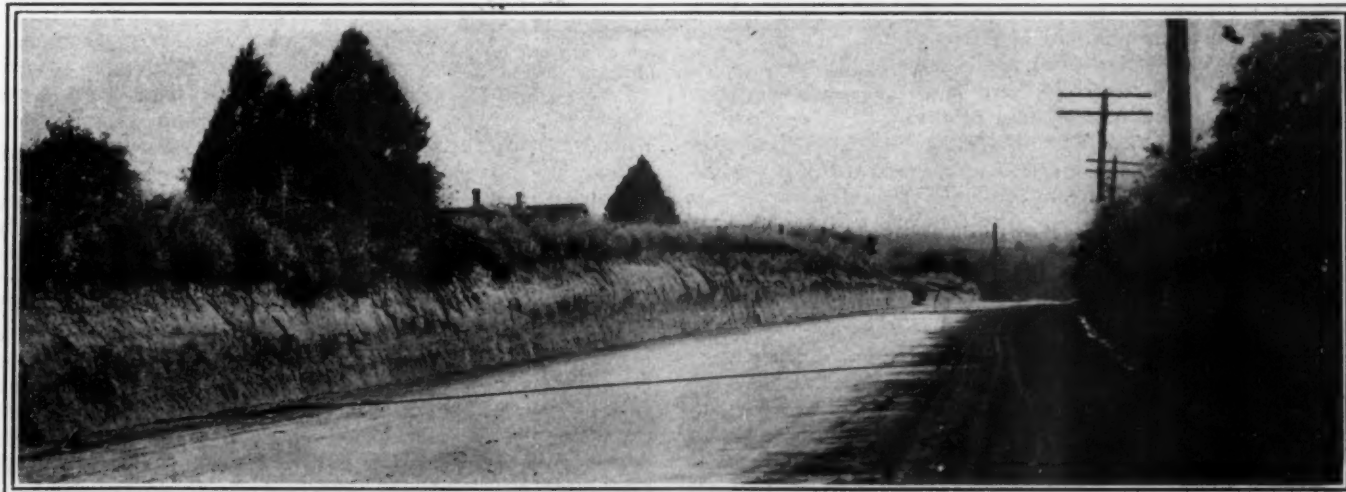
Three Examples of Present Road Conditions in the State of Georgia on New York to Jacksonville Route



In the pine-barrens not far from where the road enters Florida. Note the sand and rough, heavy going through this section



Type of southern Georgia road. This picture was taken 20 miles from Valdosta, showing character of highway for 30 miles



One stretch of the Macon boulevard which is practically 60 miles long

Digest of the Leading Foreign Journals

Discussing the Causes of the Rhythmic Thrash Characteristic of Some Types of Motors—Picturing the Structure of Steel by Means of Microphotography—New French Compressed Air Self-Starter

THE Origin of Motor Thrash—One difficulty with which the designer has to contend in his efforts for balancing a motor so that it will run silently and without vibration at all speeds is made plain to the eye in the accompanying diagram, Fig. 1. It is often supposed that the regularity of the piston speed is made all it can be if the rotary speed of the motor shaft is rendered uniform by the regularity of the power impulses and the momentum of the flywheel and if the ascending weights of pistons, connecting-rods and crank arms are balanced by means of having other similar parts or weights descending at the same time.

But the diagram shows that if the shaft turns with perfect regularity, the piston is bound to approach its upper dead center with greater speed than its lower dead center. The distance D is greater than the distance d yet must be traveled by the piston in exactly the same time, if the shaft is to turn with regularity. By laying out the diagram it is seen that the irregularity gets worse with a long stroke and with a short connecting-rod, and this may explain the noisiness of some long-stroke motors at high speed. The line PJ represents the axis of the cylinder. With a connecting-rod the length of AB, equal to HP and also equal to SJ, P becomes the high dead center and S the low dead center. The dotted circle represents the travel of the crank pin. F and B are opposite positions in this circle, and the arcs HB and FJ are equal. Consequently MB and FN are also equal, and as these are the sines of the angles a, in both cases with the length of the connecting-rod for radius, the angles a are also equal. Nevertheless the distance D from A to P is considerably greater than the distance d from C to S, as everybody may convince himself by reconstructing the diagram or by calculation. This is the point at issue. The piston must travel these two unequal distances in exactly the same length of time, as they represent equal arcs of the crank pin's travel. The pulsation which is due to this factor can apparently not be overcome in single-cylinder motors, being accentuated by high motor speed, while high speed, on the other hand, is relied upon in this type for offsetting the intermittency in the power impulses. In multi-cylinder motors, the pulsation and vibration which are due to the same cause, and which at high speed develop into the much-feared rhythmic thrash characteristic especially of long-

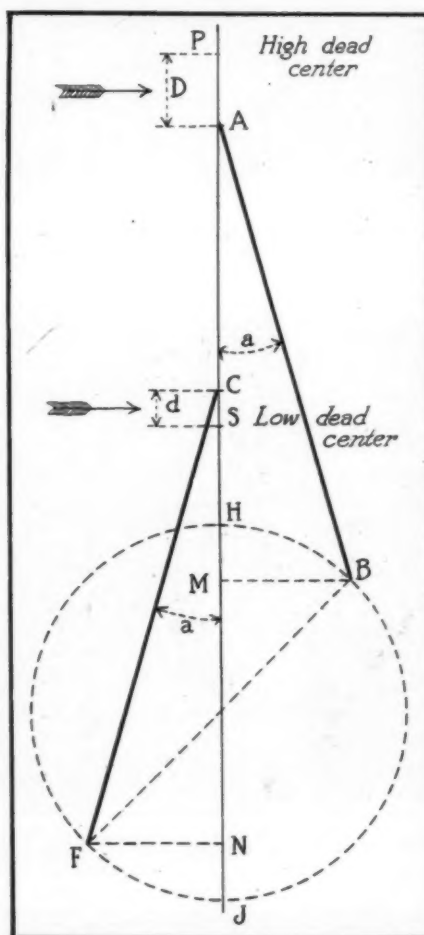


Fig. 1—Piston speed high at top and low at bottom of strokes—a difficulty in the balancing of motors

stroke motors, is not in all constructions equally well obviated and absorbed. The simultaneous ascending and descending of equal weights evidently aggravates the trouble, so far as this one peculiar cause of inequality is concerned.—Partly from *L'Auto*, March 22.

A Model Motor-Worked Farm—Seeing a new field in which the French automobile industry may gain laurels and profits, the Automobile Club de France has thrown itself with fine Gallic frenzy into the patronage of all efforts promising a development of agricultural machinery operated by motor power, especially with a view to such machines as may be owned and worked by farmers controlling only a limited acreage and limited capital. At a meeting on March 9 of the club committee having this work in charge, plans were announced for the establishment of a model farm at Amiens, where it will be the object to perform all work by motor power and determine in a practical manner what the mechanical requirements are for doing such work with real economy under different surface, soil and weather conditions. Meanwhile a competition for motor plows is to be held at Bourges in central France before long. Another competition for mowing machines, and tractors for such, will be held in July.—From *L'Auto*, March 12.

Ultra-Violet Rays Making Rubber—

It is announced in a telegram from St. Petersburg that Ostromisleski, one of the learned chemists of Europe, has succeeded in transforming a cheap raw material into veritable rubber by the action of ultra-violet light rays, the product being chemically identical with the natural latex and "six times cheaper."—From *L'Auto*, February 25.

Soldering Aluminum—Aluminum can be soldered to aluminum or to any other metal by using a soldering metal made from even parts of phosphor tin, zinc, beeswax and block tin. melted and mixed together in the order given. The beeswax must be stirred in with a wooden stick. The mixture is cast in bars. The objects to be soldered must of course be clean. No flux is used. If a blowhole has to be filled, this may be done afterwards with ordinary solder.—From *Werkstatts-Technik*, February 1.

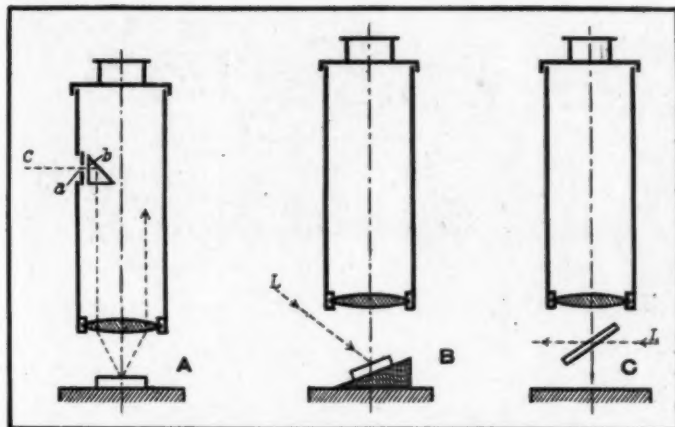


Fig. 2, A, B and C—Managing the light for microscopic examination of steel samples

Seeing the Strength of Steel—In a previous note (see under Digest in *THE AUTOMOBILE* of April 4) different methods were mentioned which are used for polishing samples of steel so as to bring out the structure and render it possible to obtain a clear picture of its peculiarities under the microscope and also a permanent record of these peculiarities by means of microphotography. It was remarked that all the processes used in this class of microscopy—the polishing, the etching, the viewing and the photographing—are passing from the laboratory of the scientist, where they were invented, to the producing engineer and the foreman of the shop, who, without possessing much insight in metallurgy, can make excellent use of them for securing uniform raw materials and uniform heat-treatment results through the mere fact that the same causes produce the same effects and that the latter may be observed under the microscope by anybody who can distinguish lines, shapes and colors. The necessity of using polished samples for deciding hardness and tensile strength by the convenient Brinell ball-imprint method has also brought the further utilization of the polished sample piece nearer to manufacturing practice.

The author shows by illustrations how, for example, a piece of tool steel which was in the first case remelted, in the second forged at a heat of 570 degrees C., and in the third case forged at 1,200 degrees C. gave three very distinctly different and yet related micropictures, and how, in another instance, a piece of manganese iron gave two notably varying structure-designs accordingly as it had been cooled quickly or slowly.

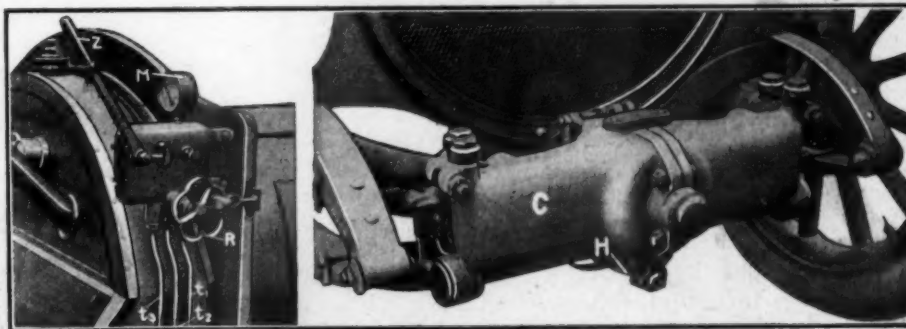
A great many different substances may be used for etching the polished surfaces in the scientific laboratory, but in shop practice it is best to be limited to a few and to see to it that the same substance is always used throughout a series of jobs the results of which are intended to impart information through their comparison, as is most frequently the case. Among the etching compounds most used in the examination of steels and cast iron, nitric acid of 1.4 specific gravity mixed with five times as much water is simple. Another crystalline chloride of cupric ammonium is obtained by mixing 12 grams of crystalline chloride of cupric ammonium with 100 grams of water which is freed from air, and if ammoniac is added to this, the solution is useful for work with all important alloys. Picric acid, 4 grams in 100 cubic centimeters of grain alcohol, produces marked yellow colorings in certain portions of steel structure and is frequently employed. If amyl alcohol is used instead of grain alcohol, the etching is slower and more easily controlled. Hydrochloric acid of specific gravity 1.19 mixed with alcohol in the proportion of 1 to 100

parts, or even more diluted, gives good lines. The hydrochloric acid merely diluted in 500 volumes of water will bring out martensitic and austenitic structure very well if an electric current is employed to accentuate the etching.

The microscopic observation of a piece of metal which must be lighted from above, since it is not transparent, formerly caused many difficulties by reason of the irregular reflections of the light, and it is still necessary to exercise some caution to avoid false or exaggerated light effects on an etched surface. The task has been made easy, however, through improvements in the optical instruments and the light sources. Fig. 2a shows a method of illumination of the test piece which is usually satisfactory. The light rays *c*, coming from a strong source, enter through an opening in the side of the tube of the microscope, and an iris-shutter *a* serves to regulate the amount of light which is to pass into the prism *b*, from which it is reflected vertically downward, without notable loss, striking one side of the objective lens by which it is refracted and condensed upon the test piece, while the sight line of the observer remains unobstructed along the axis of the apparatus. The methods indicated in Fig. 6b and c, in which *L* denotes the direction of the light, are now less commonly used, giving less uniform results.

The Barbey Compressed-Air Self-Starter—A provisional general idea of the Barbey self-starter system may be gained from the accompanying illustrations, Figs. 3 and 4, showing the apparatus attached to a Delaunay-Belleville car and in the form in which it is made by the well-known company manufacturing these vehicles. The device consists in a little four-cylinder air motor with the cylinders pairwise opposed and horizontal, all enclosed in a casing and connected by tubes with a compressed-air reservoir secured to the dashboard. When the reservoir is to be filled two of the cylinders act as a force pump, while the pistons of the other two cylinders are reciprocated idly. But in starting the vehicle motor all the four air cylinders receive air from the reservoir and co-operate in turning the motor shaft. A clutch, whose location is indicated at *H* in Fig. 4, serves to engage the shaft of the starting device with that of the motor. In Fig. 3 *Z* is the control lever; *t*₁ is the tube through which the reservoir receives air from the air motor, *t*₂ the tube admitting air to the small piston at *H* operating the connecting clutch, *R* a needle valve shutting off the connection and *t*₃ a tube for feeding compressed air to the cylinders. *M* is a pressure gauge.

If the device fails to effect a start, an ordinary starting crank may be used for this purpose by removing the cap covering the end of the shaft in the device. The apparatus is mounted between the front prongs of the vehicle frame and may be applied to any automobile of standard design without modifications or the dismantling of any parts. It can be used for the inflation of tires and as a brake, acting similarly as a motor brake for long descents.—From *La Vie Automobile*, March 28.



Figs. 3 and 4—The Barbey compressed-air self-starter device as mounted upon Delaunay-Belleville cars; Fig. 3—The compressed-air reservoir and the control elements; Fig. 4—The encased 4-cylinder air pump whose shaft turns the motor shaft



View in the electric vehicle room of the main garage of the Commonwealth Edison Company, Chicago

Electric Cars in Public Utility Service

How the Commonwealth Edison Company of Chicago Fills Its Niche in the Industrial Scheme of the Western Metropolis—Cost of Operating the Necessary Vehicles

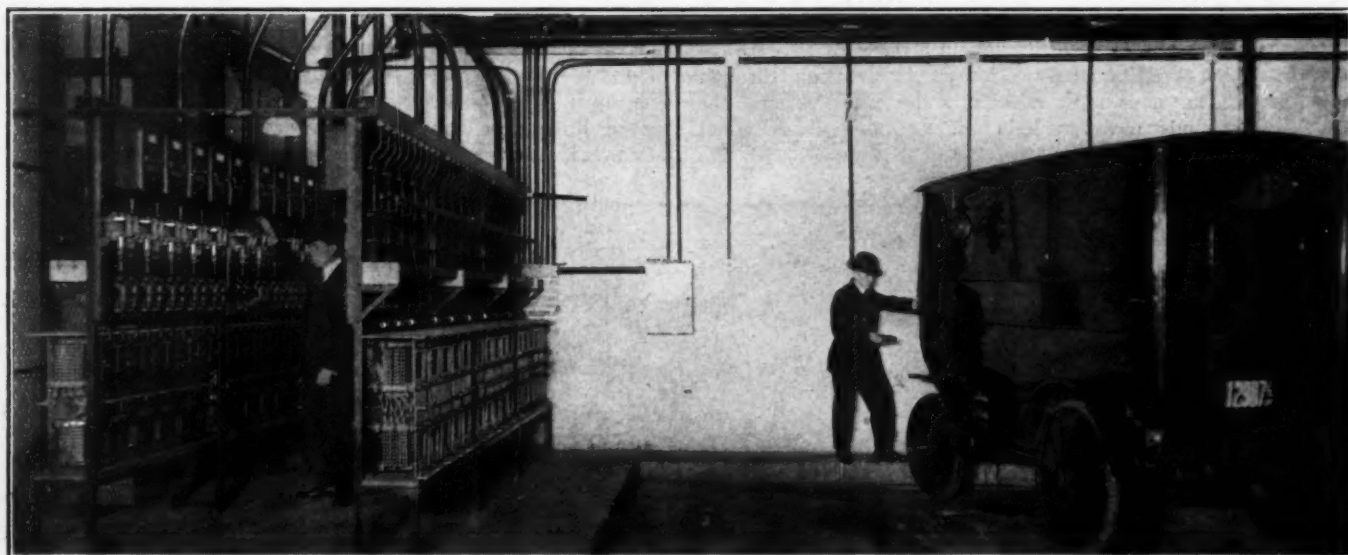
STARTING ten years ago with an initial installation of nine electric commercial cars, the Commonwealth Edison Company, of Chicago, is today the twelfth largest user in the United States of this class of vehicle. The total number of machines now in the service of the company is forty-three, but within the next few weeks twenty-five more will be added, bringing the company to the fore as having the seventh largest fleet of electric commercials in the country.

The early machines which the company used were not satisfactory, as the cost of upkeep was very high, and even then much difficulty was experienced in keeping them in condition for operation. Several years ago these first types were com-

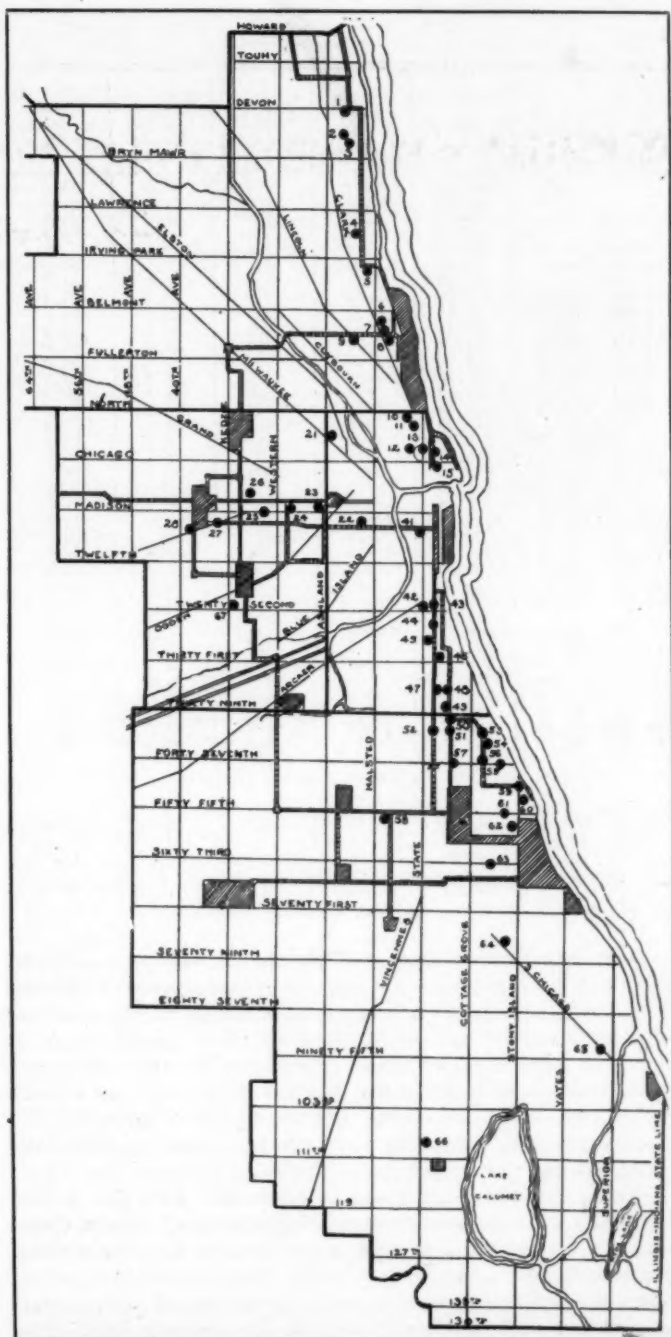
pletely overhauled and rebuilt along more advanced lines, and since that time their service in competition with horses has been most satisfactory in every respect. Since it was found that the electric could be made to pay, more have been added to the original equipment from time to time as the business has grown.

The map of Chicago which is shown herewith gives an idea of the extent of the territory which is now covered by the Edison service. There are in all sixty-seven charging stations which are supplied by the company, twelve being sub-stations which are owned by it.

At present the Commonwealth electric vehicle equipment consists of the following:



Battery charging at the Morgan Street Garage. Charging-plugs are ranged along the wall at short intervals



Map of Chicago, showing charging stations served by the Commonwealth Company

- | | |
|-------------------------|------------------------|
| 1 3-ton truck. | 2 construction wagons. |
| 1 5-ton truck. | 4 meter wagons. |
| 1 shop delivery car. | 8 lamp wagons. |
| 1 arc and sign car. | 23 supply wagons. |
| 2 cable pulling trucks. | |

Elaborate Records Are Kept

It is not to be wondered at that such a large installation should have necessitated the adoption of most approved schemes for the keeping of records of all costs incident to the operation of the vehicles, and that maintenance methods should have been devised and facilities provided whereby the cost of upkeep could be reduced to the minimum. Aside from considerations of cost, in a service of this kind, it is important to have the vehicles present a neat appearance on the streets, this point having a certain advertising value.

Although the main garage is located at Morgan and Adams

streets, not all of the machines are kept here. Several of them are quartered at the outlying sub-stations in order to reduce dead mileage in going to and from remote fields of operation. There were, at the time this investigation was made, five machines located at the south side of the city, while two were stationed on the north side. All machines, however, come in to the main garage at the end of the week.

At this main garage and charging station the office of the transportation department is located, and through it all daily and monthly cost data and performance records of the several machines must pass before going to the statistical department for recapitulation. This applies to those cars which are quartered at the outlying stations as well as to those which are kept in the adjoining main station. In *THE AUTOMOBILE*, issue of February 29, the daily and monthly record system in use by this transportation department was outlined and a number of the data and record sheets or forms were reproduced.

Garage Facilities Are Extensive

The Morgan street garage is thoroughly modern in every respect. There is room in it for the garaging of every machine owned by the company, although they are rarely all to be found within at any one time, day or night. The building is a two-story affair of brick, and there are two large rooms on the ground floor in which the machines are kept. In the smaller of the two any gasoline machines are quartered, while the larger room, which extends the entire depth of the building and over half of its width, is for the garaging of electric vehicles exclusively. One of the illustrations gives an idea of the extent of this electric vehicle room.

Along the walls on either side and about 6 feet apart are charging plugs, so that, as soon as a vehicle is backed into its space, it can be put on charge without delay.

These charging circuits are controlled from an elaborate switchboard which is located in the front part of the large electric vehicle room. On this switchboard there is a rheostat, circuit-breaker, switches and recording wattmeter in connection with each charging plug. In all there are thirty sets of apparatus, fifteen on each board of three panels.

The wattmeters are numbered to correspond with the plugs, so that the charging data in connection with each vehicle is very easily read off and set down on the blank provided for that purpose.

In the rear of the room for gasoline machines there is a



Elaborate switchboard in the Chicago Edison Garage

TABLE I

| | Number of Wagons Owned By Company | Number of Wagons In Service | Oil and Other Supplies | Energy at 4c per KWH | General Repairs | Tire Expense | Battery Expense | Total | Miles Traveled | Average K.W.H. per Mile | Average Miles per Day per Wagon in Service | Days in Service per Wagon |
|--|-----------------------------------|-----------------------------|------------------------|----------------------|-----------------|--------------|-----------------|-------------|----------------|-------------------------|--|---------------------------|
| January, 1909..... | 1 | 1 | \$10.75 | \$13.68 | ..... | ..... | ..... | \$24.43 | 617 | .555 | 26.8 | 23.0 |
| February..... | 2 | 2 | 17.96 | 23.92 | \$2.10 | ..... | ..... | 43.98 | 1197 | .500 | 24.9 | 24.0 |
| March..... | 3 | 3 | 15.26 | 42.28 | ..... | ..... | ..... | 57.54 | 2329 | .454 | 30.6 | 25.5 |
| April..... | 3 | 3 | 16.60 | 35.56 | ..... | ..... | ..... | 52.16 | 2073 | .429 | 26.6 | 26.0 |
| May..... | 3 | 3 | .85 | 37.76 | ..... | ..... | ..... | 38.61 | 2215 | .426 | 29.5 | 25.0 |
| June..... | 3 | 3 | 2.00 | 37.64 | ..... | ..... | ..... | 39.64 | 2269 | .415 | 29.1 | 26.0 |
| July..... | 3 | 3 | 39.46 | 52.92 | ..... | ..... | ..... | 92.38 | 3136 | .422 | 32.3 | 27.7 |
| August..... | 5 | 5 | 13.90 | 61.48 | 3.21 | \$1.50 | \$74.90 | 154.99 | 3660 | .420 | 28.4 | 25.8 |
| September..... | 5 | 5 | .50 | 70.60 | 7.59 | 1.50 | 17.06—Cr. | 63.13 | 4175 | .423 | 32.4 | 25.8 |
| October..... | 6 | 6 | 3.50 | 85.16 | 13.24 | 3.25 | 16.70 | 121.85 | 5080 | .419 | 32.3 | 26.2 |
| November..... | 6 | 6 | 49.80 | 85.96 | 28.39 | 207.25 | 39.74 | 411.14 | 5094 | .422 | 34.0 | 25.0 |
| December..... | 6 | 6 | 15.20 | 68.80 | 7.08 | ..... | ..... | 91.08 | 4119 | .418 | 27.5 | 26.0 |
| January, 1910..... | 8 | 8 | 8.26 | 77.64 | 186.56 | 123.00 | 26.81 | 422.27 | 4627 | .419 | 25.4 | 22.5 |
| February..... | 10 | 9 | 7.60 | 115.64 | 42.28 | ..... | ..... | 165.52 | 5353 | .540 | 26.7 | 20.0 |
| March..... | 10 | 8 | 10.75 | 115.56 | 211.83 | 117.51 | 410.79 | 866.44 | 6620 | .436 | 30.5 | 21.7 |
| April..... | 10 | 9 | 28.87 | 129.76 | 57.53 | ..... | ..... | 216.16 | 7296 | .445 | 31.1 | 23.4 |
| May..... | 10 | 9 | 23.55 | 131.56 | 91.66 | ..... | 102.72 | 349.49 | 6995 | .470 | 29.0 | 23.8 |
| June..... | 12 | 12 | 23.08 | 169.48 | 184.22 | 64.00 | ..... | 440.78 | 9919 | .427 | 31.4 | 26.0 |
| July..... | 12 | 12 | 153.44 | 182.32 | 29.11 | 290.64 | 2.78 | 658.29 | 9226 | .494 | 30.7 | 25.0 |
| August..... | 12 | 12 | 53.24 | 172.80 | 56.56 | ..... | 150.61—Cr | 131.99 | 9552 | .452 | 30.2 | 25.0 |
| September..... | 14 | 13 | 45.13 | 171.92 | 115.32 | 1.50 | 280.46 | 614.33 | 9888 | .435 | 30.7 | 23.0 |
| October..... | 14 | 14 | 96.96 | 197.00 | 153.84 | 317.50 | 419.87 | 1185.17 | 10891 | .452 | 30.5 | 24.1 |
| November..... | 16 | 14 | 27.98 | 234.04 | 313.71 | 122.32 | 9.02 | 707.07 | 10762 | .544 | 30.1 | 22.3 |
| December..... | 17 | 15 | 70.68 | 262.40 | 318.31 | 176.04 | 9.14 | 836.57 | 10715 | .612 | 28.8 | 22.0 |
| January, 1911..... | 16 | 15 | 256.50 | 234.08 | 184.24 | 48.79 | 213.06 | 936.67 | 10584 | .553 | 28.0 | 23.4 |
| February..... | 17 | 15 | 62.36 | 239.96 | 193.61 | 46.35 | 301.99 | 844.27 | 9449 | .635 | 26.4 | 21.1 |
| March..... | 19 | 17 | 36.20 | 289.28 | 249.56 | 200.61 | 132.83 | 908.48 | 12311 | .587 | 27.7 | 25.0 |
| April..... | 20 | 17 | 146.72 | 295.32 | 435.12 | 44.21 | ..... | 921.37 | 12671 | .583 | 29.7 | 21.4 |
| May..... | 20 | 17 | 218.46 | 276.00 | 279.01 | 96.27 | 98.83 | 968.57 | 14055 | .491 | 31.9 | 22.1 |
| June..... | 22 | 18 | 114.52 | 295.12 | 652.35 | 84.36 | 730.82 | 1877.17 | 15171 | .487 | 32.8 | 21.1 |
| July..... | 22 | 18 | .55 | 332.60 | 194.41 | 122.03 | 16.00—Cr. | 633.59 | 15197 | .547 | 33.1 | 20.9 |
| August..... | 24 | 19 | 44.58 | 328.68 | 512.08 | 301.10 | 1362.06 | 2548.50 | 17307 | .475 | 32.8 | 22.0 |
| September..... | 26 | 20 | 56.89 | 307.80 | 78.52 | 299.63 | 205.85—Cr | 536.99 | 16589 | .464 | 33.6 | 19.0 |
| October..... | 28 | 23 | 12.51 | 364.08 | 166.39 | 332.12 | 113.46 | 988.56 | 19102 | .476 | 31.6 | 21.6 |
| November..... | 30 | 26 | 217.39 | 390.56 | 481.77 | 416.68 | 139.43 | 1645.83 | 19863 | .492 | 30.9 | 21.4 |
| December..... | 30 | 28 | 235.34 | 429.24 | 316.67 | 267.86 | 16.79 | 1265.90 | 20731 | .518 | 30.0 | 23.0 |
| Totals..... | ..... | 414 | \$2137.34 | \$6358.60 | \$5566.27 | \$3686.02 | \$4112.68 | \$21,860.91 | 320,838 | ..... | ..... | ..... |
| Average cost per car in service per month..... | ..... | ..... | \$5.16 | \$15.36 | \$13.44 | \$8.91 | \$9.93 | \$52.80 | 775 | .495 | 30.5 | 22.6 |
| Average cost per car mile..... | ..... | ..... | 0.7c. | 2.0c. | 1.7c. | 1.1c. | 1.3c. | 6.8c. | ..... | ..... | ..... | ..... |

Statement of operative costs which extends over three years from the time of first electric installation

small room devoted to storage battery work. In this department defective cells are repaired, and there are several charging plugs for rejuvenating batteries which have run down, and which have been removed from the vehicles. Men experienced in battery matters are employed to take care of this class of work.

In this part of the building there are meters for determining the voltage and amperage and devices for determining the specific gravity of each cell. Once a week every battery is tested, and if any cell does not come up to the standard it is removed from the vehicle and remanded to this battery room for repair.

TABLE II

| | Cost per car | |
|---|--------------|----------|
| | Per month | Per mile |
| General expense | | |
| Supervision..... | \$5.47 | 0.7c. |
| Wheel tax and state license..... | 2.67 | 0.3 |
| Casualty insurance..... | 8.33 | 1.1 |
| Total..... | \$16.47 | 2.1c. |
| Operating expenses | | |
| Driver's salary..... | \$65.00 | 8.4c. |
| Washing, oiling and minor repairs..... | 20.00 | 2.6 |
| Garage expense..... | 3.99 | 0.5 |
| Other operating expenses as shown above..... | 52.80 | 6.8 |
| Total..... | \$141.79 | 18.3c. |
| Fixed Charges | | |
| Interest at 6 per cent..... | \$6.25 | 0.8c. |
| Taxes at 1.5 per cent..... | 1.56 | 0.2 |
| Insurance at 2 per cent..... | 2.08 | 0.3 |
| Depreciation at 10 per cent..... | 20.83 | 2.7 |
| Total..... | \$30.72 | 4.0c. |
| Fixed charges on garage, land and building..... | \$5.90 | 0.8c. |
| Grand total..... | \$194.88 | 25.2c. |

Summary showing total average cost per car-mile

With such facilities and with its electric vehicle experience extending over a period of years, the Commonwealth Edison Company is in a position to get at the bottom of the question of electric commercial car cost, and to know exactly where it stands in using electrics almost exclusively in place of horses.

The cost of horse equipment has not gone down; as a matter of fact, it has increased. But the electric commercial car cost per mile is decreasing with the betterment of operating conditions and the perfecting of design.

The figures which are given in connection with this article and which were obtained from the Commonwealth Edison Company are authentic and they are given to show what the electric can actually do. The service which they are called upon to perform is by no means easy on the machines. Rather, it may be regarded as being harder than in the ordinary installation for the reason that some of the cars are kept going sometimes night and day.

Statement Covers 3-Year Period

In the exhaustive statement herewith, which covers a period of 3 years from January, 1909, when the first machine was bought by the Commonwealth Company, up to and including December, 1911, thirty of the forty-three machines are considered.

The following are the capacities of the wagons which are included in the report:

| | Pounds. |
|----------------------------|---------|
| 2 machines, capacity..... | 700 |
| 4 machines, capacity..... | 1,500 |
| 4 machines, capacity..... | 2,000 |
| 20 machines, capacity..... | 3,000 |

Nineteen of the cars are equipped with batteries of the Edison make, while the remaining eleven have lead batteries.

Averaging all these different machines the total cost of each car per mile is \$0.252, which includes every item that could be

TABLE III

Electric wagon No. 16

Battery, Ironclad Exide; capacity, 3000 lb.; purchased March, 1909

| 1911 | Driver's Wages | Supplies | Painting | Purchase and Repairs | | | Total Expense | Amount Billed | KWH Used | Miles Traveled | Per Mile | | Kind of Work | Number of Days Out of Service |
|-------------------|----------------|----------|----------|----------------------|-----------|---------|---------------|---------------|----------|----------------|----------|-----|-----------------------|-------------------------------|
| | | | | Tires | Batteries | General | | | | | Cost | KWH | | |
| January | \$72.00 | \$14.51 | | | \$1.88 | \$4.50 | \$92.89 | \$175.00 | 217 | 598 | \$15.5 | .36 | Delivering supplies.. | In shop—16 days |
| February | 72.00 | 35 | \$60.85 | | | 50.64 | 183.84 | 175.00 | 387 | 992 | 18.5 | .39 | " | " |
| March | 72.00 | 1.77 | | \$55.35 | 9.42 | | 138.54 | 175.00 | 410 | 958 | 14.5 | .43 | " | " |
| April | 72.00 | 3.41 | | | | 5.85 | 81.26 | 175.00 | 449 | 1070 | 7.6 | .42 | " | " |
| May | 67.36 | 5.80 | | 5.00 | | 10.80 | 88.96 | 175.00 | 446 | 1350 | 6.6 | .33 | " | " |
| June | 73.50 | 58.48 | | | 1.34 | 12.70 | 146.02 | 175.00 | 398 | 1008 | 9.4 | .26 | " | " |
| July | 72.00 | | | | 2.00 | .05 | 70.05 | 175.00 | 399 | 1464 | 7.0 | .40 | " | " |
| August | 72.50 | 4.28 | | 44.63 | 4.63 | 13.50 | 139.54 | 175.00 | 377 | 1003 | 1.2 | .37 | " | " |
| September | | 5.85 | | 2.50 | | 4.35 | 12.70 | 175.00 | 89 | 248 | 19.3 | .36 | " | In shop—6 days. |
| October | 56.00 | 12.00 | 60.85 | 44.84 | 3.06 | | 28.82 | 157.67 | 481 | 1202 | 13.1 | .40 | " | In shop—25 days. |
| November | 56.00 | 81.58 | | 37.95 | | 4.18 | 171.35 | 175.00 | 438 | 1187 | 144 | .37 | " | " |
| December | 56.00 | | | | | | | | | | | | " | " |
| Total | 685.36 | 188.03 | 121.70 | 190.27 | 18.33 | 127.03 | 1330.72 | 1925.00 | 4567 | 12630 | 10.5 | .36 | | |
| Average per month | 57.10 | 15.67 | 10.14 | 15.86 | 1.53 | 10.59 | 110.89 | 160.42 | 381 | 1053 | 10.5 | .36 | | |
| Average per mile | 5.4c. | 1.5c. | 1.0c. | 1.5c. | .1c. | 1.0c. | 10.5c. | 15.2c. | .36 | | | | | |
| Previous | 1152.00 | 148.93 | | 174.31 | 115.61 | 383.81 | 1974.66 | 3018.00 | * | 15908 | 12.4 | * | | |
| Total to date | 1837.36 | 336.96 | 121.70 | 364.58 | 133.94 | 510.84 | 3305.38 | 4943.00 | | 28538 | 11.6 | | | |
| Average per month | 61.25 | 11.23 | 4.06 | 12.15 | 4.46 | 17.03 | 110.18 | 164.76 | | 951 | 11.6 | | | |
| Average per mile | 6.4c. | 1.2c. | .4c. | 1.3c. | .5c. | 1.8c. | 11.6c. | 17.3c. | | | | | | |

Electric wagon No. 37

Battery, Edison; capacity, 2000 lb.; purchased December, 1909

| 1911 | Driver's Wages | Supplies | Painting | Purchase and Repairs | | | Total Exp. | Amount Billed | KWH Used | Miles Traveled | Per Mile | | Kind of Work | Number of Days Out of Service |
|-------------------|----------------|----------|----------|----------------------|-----------|---------|------------|---------------|----------|----------------|----------|-----|--------------------|-------------------------------|
| | | | | Tires | Batteries | General | | | | | Cost | KWH | | |
| January | | \$15.15 | | \$43.79 | | \$29.09 | \$88.03 | \$115.00 | 434 | 727 | \$12.1 | .60 | Hauling lamps..... | |
| February | | .30 | | | | 7.65 | 7.95 | 115.00 | 465 | 605 | 1.3 | .77 | " | |
| March | | 1.76 | | 4.16 | | 14.79 | 12.39 | 115.00 | 556 | 768 | 1.6 | .72 | " | |
| April | | 28.95 | | | | 15.60 | 44.55 | 115.00 | 453 | 639 | 7.0 | .71 | " | |
| May | | 29.27 | | | | 29.27 | | | | | | | " | |
| June | | .70 | \$54.90 | | \$1.49 | 17.90 | 74.99 | 115.00 | 246 | 384 | 19.5 | .63 | Hauling lamps..... | In shop all month. |
| July | \$2.00 | | | | | 47.38 | 49.38 | 115.00 | 484 | 667 | 7.4 | .73 | " | In shop 14 days. |
| August | | | | 157.17 | 20.97 | | 178.14 | 115.00 | 490 | 793 | 22.5 | .62 | " | |
| September | | .24 | | | | 15.71 | 15.95 | 115.00 | 421 | 714 | 2.2 | .59 | " | |
| October | | 1.01 | | | | | 1.01 | 115.00 | 407 | 734 | .001 | .57 | " | |
| November | | 4.99 | | | | 35.51 | 40.50 | 115.00 | 395 | 748 | 5.4 | .53 | " | |
| December | | 5.75 | | | | | 5.75 | 115.00 | 399 | 745 | .8 | .54 | " | |
| Total | 2.00 | 88.12 | 54.90 | 196.80 | 22.46 | 183.63 | 547.91 | 1265.00 | 4750 | 7524 | 7.3 | .63 | | |
| Average per month | .17 | 7.34 | 4.58 | 16.40 | 1.87 | 15.30 | 45.66 | 105.42 | 396 | 627 | 7.3 | .63 | | |
| Average per mile | 1.2c. | .8c. | .2c. | 2.6c. | .3c. | 2.4c. | 7.3c. | 16.8c. | .63c | | | | | |
| Previous | 55.61 | | | 48.10 | 101.24 | 231.30 | 436.25 | 1311.25 | * | 7538 | 5.8 | * | | |
| Total to date | 200 | 143.73 | 54.90 | 244.90 | 123.70 | 414.93 | 984.16 | 2576.25 | | 15062 | 6.5 | | | |
| Average per month | .08 | 5.75 | 2.19 | 9.80 | 4.95 | 16.60 | 39.37 | 103.05 | | 632 | 6.5 | | | |
| Average per mile | 1.0c. | .4c. | .1c. | 1.6c. | .8c. | 2.7c. | 6.5c. | 17.1c. | | | | | | |

How the individual records for each machine are kept. The condition and performance information is of great value to the company

properly charged to transportation. This takes into account the fixed charges of interest, depreciation, taxes and insurance.

The figures are slightly unfair to the smaller vehicle of about 1,500 pounds, as most of those considered are of the 3,000-pound class. However, since the average covers a period of 36 months it comes nearer to representing costs as they actually are than any other like compilation which has yet been published.

It will be noticed that the number of wagons owned by the company is given in a separate column from the actual number of wagons in service. This is done in order to show the number of vehicles out of service each month due to overhauling, painting, etc.

Kilowatt Consumption Low

The item of cost of electrical energy is of special interest to the intending user of electrical transportation. It is seen to cost only 2 cents per car-mile. In other words, the average energy used is one-half of 1 kilowatt-hour per car-mile. In figuring the electric energy at 4 cents per kilowatt-hour the company endeavored to arrive at the average cost. This figure may be a trifle higher than it should be for the concern which operates a number of vehicles, and somewhat low where only one or two machines are in service.

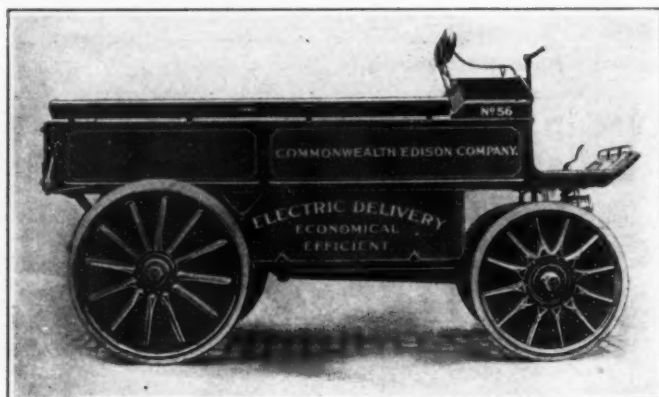
*No individual record kept previous to 1911.

The item of general repairs is remarkably small when it is considered that these vehicles are in almost constant service, and that the traffic conditions are bad in Chicago, and hence the liability of accident is somewhat above the average.

The tire expense column affords an interesting consideration. It will be noticed that the first tire replacement is charged to the month of November, 1909, or 11 months after the first installation. At that time \$207.25 was expended for tire renewal, which is a very good showing for operation on bad pavements and cobblestones.

In regard to the average kilowatt-hours per mile, the figure of 0.495 is about the average which is to be found in similar installations of the kind. It must be borne in mind, however, that these figures are averages only and that they do not favor the smaller cars in this respect, the energy consumption of the latter being below the average.

The mileage covered per machine per month is of especial interest, in that the ability of the truck under none too favorable conditions is brought out. The figures show that during this long period each machine averaged 775 miles per month, or 30.5 miles per day, making each cover about 9,000 miles in a single year. Reference to the table of days in service per wagon shows that even with this mileage the rigs were not pushed to their maximum, as they averaged 22.6 days in operation out of every month.



Delivery vehicle in Chicago Edison service

The average statistician on electric vehicle matters considers the operative year as 300 days as a fair estimate, but it is here shown that the figure is not equalled in this installation at least. The figure of 22.6 days when multiplied by 12 months becomes 271.2 days in service. This goes to show that if the items had been figured on a 300-day basis instead of that actually determined, the per day costs would have been still further reduced.

In arriving at the total cost per car-mile the items set down under general expense will not be found in the average tabulation of the kind, but they are, however, directly chargeable to the vehicles. Supervision is apportioned equally among the cars and takes in the salaries of the superintendent of transportation and his assistants. The wages of the garage men are covered under the item of garage expense in the operating expenses column.

The item of washing, oiling and minor repairs which appears under the head of Operating Expenses, amounting to \$20 per month, includes approximately \$4 per car for washing and the balance for minor repairs done at the company's transportation repair shop. It also includes the cost of battery care.

Although some will not agree that fixed charges on land,

garage and building should be included, these are really items which should be considered, and they are so treated by the Edison company.

The figures here tabulated have been beaten in New York, as a similar installation in the latter city has been found to figure about \$0.2208 per car-mile. But in New York the conditions are somewhat different; the pavements are better and the congestion of traffic is less. Both of these points must be considered in making comparisons. It is certain, however, that, for cities of the average type as found in this country, these figures represent the best that can be expected, taking everything into consideration. They may be regarded as about the best attainable in Chicago.

It is interesting to note the manner in which such a tabulation as that given is made up. For every vehicle in its service the Commonwealth Edison Company has a separate tabulation sheet, identification being made by means of the vehicle number which appears at the top. The sheets are a recapitulation of daily reports and they extend over a period of a year.

These vehicle sheets are bound together in a single book, so that complete information on any vehicle is instantly obtainable. Two of these sheets, for wagons Nos. 16 and 37, are given here. They show the performance records for the complete year 1911. From these individual wagon data the complete record already discussed was made.

It will be noticed that No. 16, which is used for delivering supplies, traveled on an average of 951 miles per month during the year just passed. Further, it was out of service only 47 days last year.

In presenting these figures THE AUTOMOBILE feels that it has set before its readers an unbiased tabulation of actual electric vehicle costs which is more exhaustive and extends over a greater period than has ever before been covered.

The costs given do not favor the maker nor the buyer. A number of different types and makes of electrics are considered in the report. The figures, being the best obtainable, should offer a basis for comparison and computation for the benefit of manufacturer and buyer alike.

FROM *The Motor Review*,
April 10, 1902:

The Nice-Abbazia race and tour was stopped April 2 by executive action of the Italian Premier. As the start of the race was scheduled for April 7, the action of the authorities caused much disappointment and indignation on the part of the French and Italian motorists.

The first meeting of the newly-formed American Automobile Association was held last week at the Automobile Club of America. The Automobile Club of America relinquished control of racing to the new organization and the racing rules of the A. C. A. have been adopted by the A. A. A.

A match race has been framed between W. K. Vanderbilt in his Daimler-Mercedes against Henri E. Rothschild in a similar car to take place in France over a course 136.62 miles long, not later than May 15.

The Washington Electric Vehicle Company, operating a line of electric busses at the capital has been sustained in its contention that it was not liable for the \$10 vehicle fee imposed under the statute of 1871. Suit was brought against the company in the Police Court and adversely decided. The Court of Appeals reversed the findings.

The first run of the year under the auspices of the Automobile Club of America was held last Saturday to Ardsley-on-Hudson. There were sixteen cars in the run. For the first time in America the contestants followed a pacemaker, who kept within the limits of the Cocks law.

The New York Athletic Club run to Travers Island Saturday was a big success. The first contestant to complete the

Harking Back a Decade

course was Lafayette Markle with a 12-horsepower Peugeot. W. K. Vanderbilt, Jr., and

David W. Bishop were jailed in Luc, France, for motoring without lighted lamps during a night run last week.

The Swiss laws prohibiting the use of the automobile in certain beautiful mountain cantons are causing much annoyance to German tourists en route to Italy. The pass of St. Gothard is the last great mountain route to be declared closed to motorists.

"The coming season promises to be prolific of arrests and disputes over the speed question, and as a matter of self-defense the clubs and individual motorists cannot do better than to promote contests to demonstrate exactly what 12, 15, 20, 25 and 30 miles an hour actually represent in the way of speed. Under existing conditions there can be but slight hope for equitable enforcement of such speed laws as experience has proved necessary."—*Editorial*.

The use of a green lens for the left-hand lamp of an automobile is meeting with favor in Boston, as it tells pedestrians in what direction the machine is going.

Acetylene Generators Described—In a 100-page pamphlet published by *Office Central de l'Acétylène*, Paris, which represents the united acetylene interests of France, descriptions and drawings are given of about 30 acetylene generators which have been proved reliable in practice. The illustrations show the interior organs of each apparatus. The price is 15 cents (.60 franc) in France.

The Ideal Automobile for 1913

Some of Our Readers' Conceptions of What Next Year's Car Should Be

Engine to Have Perfect Valves

EDITOR THE AUTOMOBILE:

Permit me to submit my idea of the modern automobile for any year's model.

The motor should be a 3 1-2-inch by 5-inch type, four-cylinder, four-cycle, with rotary valves, spark-plugs in the heads of the domes, valves made self-grinding and self-compensating for wear expansion and contraction. The flywheel should be incased with a winding within it for both motor and generator to provide current for storage batteries, to start the motor and to operate the ignition and lighting system. There should be automatic lubrication from a sump in the flywheel housing, without pipe or pump. A two-bearing crankshaft with die-cast bearings which are accessible should be included, as well as a G. & A., or some other satisfactory, non-adjustable carbureter.

The cooling system should be a water, thermo-syphon system, with large water jackets surrounding the rotary valves.

The frame should be of laminated wood construction, under-slung and equipped with elliptic springs, the rear springs being hidden under the body and away from the dirt.

The body should be a torpedo type, wind and dust resisting. All brakes, rods, levers and machinery should be inclosed, either within or under the body. All body and frame constructions should be along straight lines with a view to protection from mud and dust.

The wheels on roadsters of this design should be 32 by 3 inches, and 32 by 3 1-2 inches on touring cars. A wheelbase of 110 to 124 inches, a roadster weight of 1,000 pounds and a touring car maximum weight of 1,250 pounds would be desirable.

The lamp equipment should be electric throughout, with oil auxiliary for side and tail lights. The motor installation should be such that it would be completely accessible at all times by raising the hood.

An experience of 10 years with twelve makes of cars has proven, to my satisfaction at least, that the average automobile could not be made more inaccessible if designed with that end in view. It not infrequently happens that it costs \$10 to take down a part of the car to replace a part costing 10 cents. Magnetos, carbureters and other accessories are almost invariably placed where repairs or adjustments are impossible, without dismantling the part. Clutch repairs, especially on those of the

Mechanical Details Secondary

EDITOR THE AUTOMOBILE:

The ideal car of the future takes many shapes and forms according to the readers of THE AUTOMOBILE. While I am not a very prolific writer of my views on any subject, I find that I can express myself fairly well by means of sketches. Accordingly, I have inclosed what I term my ideal car. It does not differ greatly, perhaps, from the machines which are now to be had, for the reason that I believe the present automobile to be as near to the ideal as any man is going to come for some time yet.

The wheelbase is about 130 inches in this car of mine, and with that length, the body is amply large for seven passengers. I have attempted to show that the rear seat should be a little in front of the rear axle for easy riding. I would accomplish this without encroaching upon the close-coupled body idea.

The engine should be very powerful so as to meet all emergencies and to maintain a reasonable speed at all times when required. The internal details of the car's construction would not interest me specially. So long as the machine would have a good appearance, power, ease of control, silence and good riding qualities, I would not care whether it had four-cylinders or twenty-four, or whether it had a gasoline engine or a steam engine.

South Bend, Ind.

L. J. YOUNG.

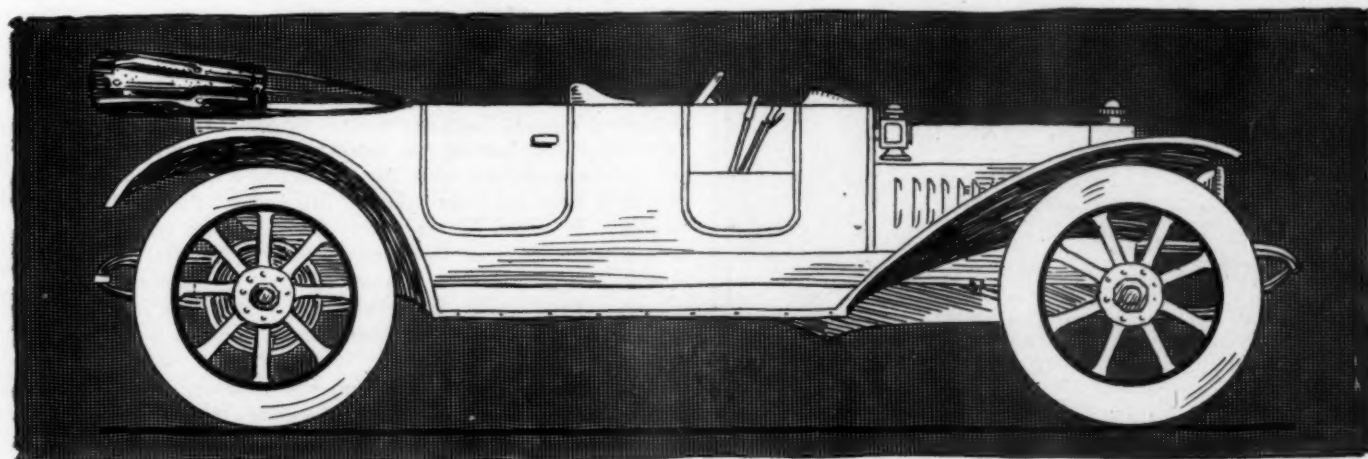
multiple-disk type, cannot be accomplished without a complete dismantling of engine or transmission. The cost of labor in getting at the part in fault is greatly out of all proportion to the part to be replaced, due solely to inaccessibility.

Though there are many good cars on the market, of which the writer is the fortunate possessor of three, there are none which meet the ideas of the undersigned as to either method of construction and means employed for propulsion. A car is now being built on the lines above described, and in due season I will be glad to give the readers of THE AUTOMOBILE a report of its operation with sectional cuts of its construction, together with a complete description of the rotary valve motor referred to.

Prices are not stated, but should be for the roadster \$650 and for the touring car \$800.

Galveston, Texas.

GEO. G. CLOUGH.



L. J. Young gives his ideas of the ideal automobile by means of a sketch

Letters Answered and Discussed

Oil Not the Cause of Knock; How to Take Down a Motor; How to Find Specific Gravity; Why Cars Swing When Brakes Are Applied; Knight Motor Timing

Oil Alone Will Not Cause Knock

EDITOR THE AUTOMOBILE:

Will you tell me through THE AUTOMOBILE if too much oil in a crankcase will cause a motor to pound when the throttle is open about one-third of the way and the spark is almost entirely retarded?

I think the knock is in the second cylinder, and have had same off, but found that the bearings were not loose and the piston rings seem to be in good shape. This cylinder has not as much compression as the rest, although I have ground the valves. I drained the oil down to a lower level and the knock does not seem to be so bad.

Washington, D. C.

G. E. S.

The knock is not caused by too much oil in the crankcase unless you have had the lubricant there for such a length of time that a thick carbon deposit has accumulated in the cylinder. In this case a knock will be produced on account of the pre-ignition of the charge. The carbon glows after the deposit becomes thick and it is necessary to remove the carbon if this is the cause of the knock. In your case the knock is almost certainly in a loose bearing or connection since it seems to be confined to one cylinder. Examine the wristpin set screw and the connecting-rod bearing at the lower end and the main bearing caps and see if they are as tight as they should be. There should be no lost motion. The piston itself may be worn if the car has been run for a long time.

It would be advisable to first try a carbon remover before taking down the motor, as this may possibly be the cause of the trouble. Put a cup of kerosene in the head of the number 2 cylinder and run the motor on the other three for 5 minutes. Then, while the motor is still running, open the petcock and blow out the kerosene.

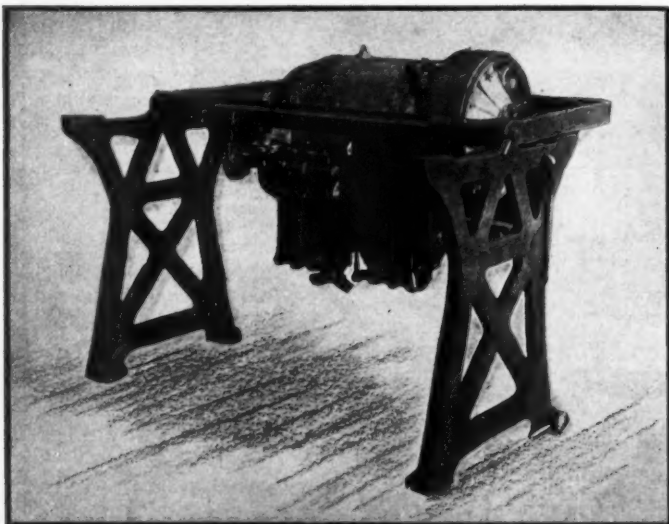


Fig. 1—Motor frame of the type in common use

The Way to Take Down a Motor

EDITOR THE AUTOMOBILE:

I have a rather extensively outfitted shop in which I do all the work necessary on my own car and besides have done a little outside. I find that in taking down a motor I would be able to do the work much better if I had some sort of stand adapted for the purpose. Would you kindly illustrate a type of stand such as is used in the best metropolitan repair shops? I would like to know this and also the order of procedure in tearing down a motor to give it a thorough overhauling. What is the best order in which to take out the parts when stripping the motor bare?

Milltown, N. J.

EDWARD SHEARNES.

Assume the car to be rolled to its required place on the garage floor. The traveling crane or block and tackle is then called into requisition and moved over until it is above the motor. The bolts which hold the motor to the frame and all other motor connections being removed, the block and tackle is called into requisition and the motor lifted clear of the chassis. The well-equipped shop should have a motor frame in which the work on the motor can be carried on. A type of motor frame is shown in Fig. 1. In this frame the motor can be turned upside down by means of a hinge so that it is possible to work beneath with a minimum amount of trouble. The motor is fitted to the frame in the same manner that it is bolted to the chassis members, the bolts passing through the crankcase supporting arms and into the side members of the motor frame.

While the motor is right side up in the frame, the crankcase drain plugs are removed and all the oil drained off into a pan so that the floor in the neighborhood of the stand is kept clean. The fan bracket and fan are removed, then the magneto and pump shaft, the water manifold, intake and exhaust manifolds, timing gears, tappets, tappet guides, and all the other exterior fittings outside of the bare castings are taken off and placed in pans or trays so that none of the smaller parts are lost. The motor is then turned over and the lower part of the crankcase removed. The crankshaft bearing caps can then be taken off the lower ends of the connecting-rods as well as the main bearings. The crankshaft is then lifted out, leaving the workman free to pull the pistons out of the cylinders with the connecting-rods attached. The cylinders, as a rule, need not be lifted from the crankcase as they will be found to be very accessible when the motor is held in a rack or frame of this type. However, in case it is necessary to do a considerable amount of work in the line of scraping, etc., in the inside of the cylinders, it would be just as well to remove them so that the work can be done on a bench convenient to the light and tools.

A home-made frame should suit your purpose very well. It can be readily made with a little ingenuity from pipe connections. The lines of the frame shown in Fig. 1 are followed exactly, the hinge being composed of a stout steel rod passed through the pipe from which the motor is supported, as shown

in Fig. 2. Full directions as to how to go about making such a frame will be furnished to anyone caring to construct it by the Editor of the Questions Department.

To Find the Specific Gravity

Editor THE AUTOMOBILE:

Would you please inform me what method is generally in use for the calculation of the specific gravity of liquids?

Plainfield, N. J.

J. G. WESTEN.

The method generally employed in determining the specific gravity of a liquid makes use of the instrument known as a hydrometer. The principle involved in the use of the hydrometer is that it has a constant weight, while its displacement in liquids varies with the density. The hydrometer in its general form consists of a glass tube near the bottom of which is a large bulb filled with air. Below this is another bulb filled with mercury or some other metal which causes the bottom to sink when placed in the liquid. The volume of the upper bulb filled with air is of such size and the graduations which are marked upon it are so arranged that if the hydrometer were put in distilled water the instrument would sink until the level of the water is at 0. The instrument is put in the liquid the specific gravity of which is to be determined, and this is read from the graduations of the scale directly.

Car Swings with Brakes Applied

Editor THE AUTOMOBILE:

Will you kindly explain why locking the wheels with the brakes has a tendency to swing the car around so that the rear wheels are ahead?

While this seems to be the real reason for enduring the complications necessarily inherent in front wheel brakes, I have never seen an explanation of this action in any technical publication.

Allegheny, Pa.

MURRY FAHNESTOCK.

This is a question which has been argued more than once before the foreign automobile engineering societies. American practice has abandoned the front wheel brakes. The reason that the car swings about when the rear brakes are applied is not one that can be picked out very exactly, but it is almost certainly due to the fact that it is practically impossible to perfectly equalize the braking forces. Too many factors enter into the problem. The crown of the road will put more weight upon one wheel than on another, thus making a pivot generally of the rear right wheel causing the car to swing to the right and out of the road. The car may be unequally loaded, thus having the same effect as the crown of the road in making a pivot of the wheel above which most of the load is concentrated. The surface of the road beneath each wheel is apt to vary, thus offering differences in frictional resistance upon which braking the wheels depends. Even the brake linings will vary as to their gripping power so that it is very evident that many variable factors enter into brake equalization and hence the tendency for one wheel to form a pivot about which the car will swing.

Good Lacquer for Polished Brass

Editor THE AUTOMOBILE:

I would like to know if you could give me a good formula for a lacquer or varnish to be put on polished brass so that the polish will be preserved for a greater length of time.

Mansfield, O.

H. E. WILSON.

The surfaces are first carefully polished and then freed from every trace of grease. A lacquer is then applied. The lacquer may be prepared thus: Bleached shellac, 60 grams; Manila copal, freshly powdered, 60 grams; gum mastic, 60 grams; absolute (grain) alcohol, 1 kilogram; coarsely powdered glass, small quantity; allowed to stand (frequently shaking) for 14 days; boracic acid, 1 gram. Filter and use, the best plan being to apply repeated thin coats.

Any desired color may be given to the lacquer by adding aniline dyes. A very little of the dye of the color selected will serve for the purpose. Red and blue will form clear solutions; green must be handled cautiously; it may be have to be filtered; yellow is a good dye to handle. In applying lacquers it is desirable to go about it in the same way as shellac is applied—thin coats, deftly applied by means of a suitable brush, with very little rubbing; it will become tacky if it is rubbed very much. When the coloring matter is not added, the lacquer will be transparent and may be used over the polish on the brass which it preserves for a time.

The Timing of Knight Motors

Editor THE AUTOMOBILE:

Will you kindly publish a table of the timing of the Knight motor, giving the opening and closing of the intake and exhaust valves?

Galveston, Texas.

GEORGE G. CLOUGH.

The valve timing of the Columbia-Knight engine is as follows:

| | |
|-----------------------|--|
| Intake valve opens: | Top dead center. |
| Intake valve closes: | 50 degrees past bottom dead center or when piston is $\frac{3}{4}$ inch above the bottom of the stroke. |
| Exhaust valve opens: | 60 degrees above bottom dead center or when piston is $1\frac{3}{64}$ inches above the bottom of the stroke. |
| Exhaust valve closes: | 15 degrees past top dead center or when piston is $\frac{7}{64}$ inch below the top of the stroke. |

The timing of the Stoddard-Knight is as follows:

| | |
|-----------------------|---|
| Inlet valve opens: | 20 degrees past top dead center or when piston is $\frac{13}{64}$ inch below top of stroke. |
| Inlet valve closes: | 40 degrees past bottom center or when piston is $\frac{17}{32}$ inch above bottom of stroke. |
| Exhaust valve opens: | 65 degrees above bottom dead center or when piston is $1\frac{21}{64}$ inches above bottom of stroke. |
| Exhaust valve closes: | 20 degrees past top dead center or when piston is $\frac{13}{64}$ inch below top of stroke. |

Difference in Viscosity Meters

Editor THE AUTOMOBILE:

Would you please tell me the difference in the readings on a Saybold viscosity meter and one of the Tagliabue type? That is to say, taking a specific case, what would be the corresponding reading on the Tagliabue type of 40 or 50 seconds at 210 degrees Fahrenheit on the Saybold meter? I understand that this is the specification for a light lubricating oil on the latter instrument, and I would like to know the specification on the Tagliabue.

Bath, Me.

L. C. M.

Viscosity at 210 degrees Fahrenheit when equal to 40 or 50 seconds on the Saybold scale would equal 60 or 65 seconds on the Tagliabue scale. This is the ideal specification for a light automobile engine lubricating oil such as could be used to advantage in warm weather.

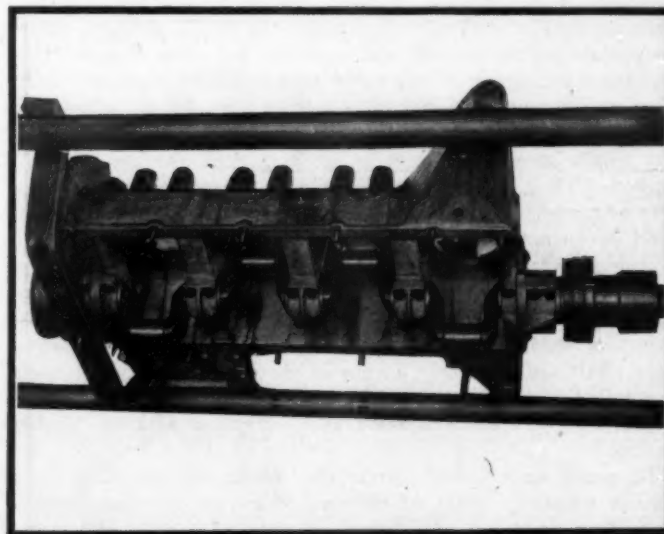


Fig. 2—How the motor is held on a pipe frame

Automobile Metallurgy Made Easy

By E. F. LAKE

ONE of the newest of the steels which have recently been placed on the market, silico-manganese steel, doubtless owes its existence to the demand of automobile builders for better steels than were in commercial use before the advent of the motor car. While classed with the alloy steels, it has no ingredient that is different from the ordinary carbon steels. The silicon content, however, is raised to a very high figure and nearly 50 per cent. more manganese is used than is present in ordinary steels. For these reasons it is called an alloy steel.

The brands that are of the most interest to automobilists have a silicon content that is between 1.90 and 2.10 per cent., instead of one that is kept below 0.20 per cent., as is the case in ordinary steels, or reduced to a minimum as it is in many other steels. The manganese content in these ranges from 0.75 to 0.85 per cent., the carbon from 0.40 to 0.45 per cent., with the sulphur and phosphorus below 0.035 per cent. Some steel-makers, however, vary these percentages and they may be found with a carbon content varying from 0.25 to 0.60 per cent., a manganese content varying from 0.75 per cent. to 1.00 per cent., and a silicon content as low as 1.40 per cent. The phosphorus in most of the better grades is kept below 0.02 per cent.

Another grade is used for high tensile plates. The silicon in this is from 0.60 to 0.80 per cent. and the carbon content around 0.30 per cent.

Silicon is the second most important element in the solid part of the earth's crust, about one-quarter of it being silicon, or, to be more exact, 27.21 per cent. In this regard it is only beaten by oxygen, the proportion of which is 47.29 per cent. Thus almost three-quarters of the earth's crust is oxygen and silicon, while 79.28 per cent. of the earth's solids, liquids and air are of these two materials.

Like many other elements it owes its importance in metallurgy to the electric furnace, as before that it was not possible to obtain ferro-silicons that were rich in silicon and hence it could not be utilized successfully in steelmaking. Since the commercial production of ferro-silicon its use has gradually increased in steelmaking. Until a content of 4.00 per cent. has been reached in steel silicon increases the tensile strength about 80 pounds per square inch for each 0.01 per cent. Beyond this amount a weakening of the metal seems to take place and more than 5.00 per cent. of silicon is seldom used in steels for any purpose. It takes about 0.13 per cent. of silicon to increase the tensile strength of steel as much as does 0.01 per cent. of carbon. Thus, 2.0 per cent. of silicon is equivalent to about 0.15 per cent. of carbon, as far as increasing the strength of steel is concerned.

A high percentage of silicon renders steels very low in their resistance to shocks unless a considerable percentage of manganese is added thereto, and the silicon largely neutralizes any injurious tendencies the manganese may have. Silico-manganese steels are extremely fibrous in the direction in which they are rolled and show a remarkable resistance to shock in this direction, but practically none in a direction at right angles thereto.

In many ways silicon affects the results of quenching in a similar manner to that of carbon and its good properties are dependent upon the co-existing amounts of carbon and manganese. When the carbon is low the silicon may be raised to

XXI—Silico-Manganese Steel

This Metal Is Much Used in the Making of Automobile Leaf Springs

a fairly high figure, but if the carbon and silicon are both high the steel will be brittle, and this is also the case where the phosphorus and silicon are both high in percentage. This accounts for the comparatively low

carbon content of silico-manganese steels.

Like all high-grade steels, however, they must be made in small heats if the best results are to be obtained. In automobile construction this steel has been used to a much larger extent in France than it has in this country. It can be more easily heat-treated than other alloy steels, as a variation of 100 degrees in the hardening temperature and 50 degrees in the drawing temperature will not materially affect the metal; whereas, nickel or nickel-chrome steels will vary if the hardening temperature is not kept within a range of 25 degrees and the drawing temperature within a range of 15 degrees. Likewise, the high-carbon steels are very sensitive to heat-treatment and must be hardened and tempered within a few degrees of the exact temperatures.

Like all alloy steels, the silico-manganese steels must be properly heat-treated to bring out their greatest strengths, highest resistance to strains and best-wearing properties, or longest life. In the annealed state the tensile strength runs from 90,000 to 100,000 pounds per square inch and the elastic limit from 60,000 to 70,000 pounds. When properly hardened these can be raised to from 200,000 to 250,000 pounds for the tensile strength and between 175,000 to 200,000 pounds for the elastic limit.

In one case in particular, a change-speed gear that was tested gave a tensile strength of 233,300 pounds per square inch, an elastic limit of 183,800, an elongation of 7 per cent., and a contraction of 26 per cent. This proved it to be much better than 3 1-2 per cent. nickel steel, high-carbon steel that is only heat-treated, or low-carbon steel that is first carbonized and then heat-treated. The best results that could be obtained with these were a tensile strength of 160,000 pounds per square inch, an elastic limit of 150,000 pounds, and an elongation and contraction that was very low.

Makes Tough, Elastic Springs

With silico-manganese steels, carbonizing, which is a slow, laborious process, can be done away with and the steel given the ordinary heat-treatment after it has been manufactured into gears. There is much difference of opinion, however, as to its practicability for automobile gears and it may not be used for this purpose as much as it was a few years ago.

Its fibrous structure in the direction in which it is rolled and the toughness that is given it by the manganese, when the steels are well made, seem to make it one of the best steels on the market for manufacturing into leaf springs. It is, therefore, used to a large extent on some of the best cars for this purpose and its price is not high, when compared with other alloy steels. When properly heat-treated for automobile springs and then broken for examination of its grain, it shows a tough, hickory fracture, and it is not difficult to obtain an elastic limit of 225,000 pounds with a tensile strength of 250,000 and an elongation of 12 per cent. For all other automobile parts, unless it be gears, the steels described in former articles seem to give much better results so the use of silico-manganese steels should be confined to the making of leaf springs.

Manganese steel is an entirely different product from that described above. This contains a comparatively high percentage of manganese and is only suitable for a few purposes. After a manganese content of 2 per cent. has been passed steels containing it are very brittle and, therefore, useless for any purpose. This kept steelmakers from putting any more into steel until about 20 or 25 years ago when a steelmaker in Sheffield, England, made a mistake and put in a large amount of manganese. The finished metal showed such extraordinary properties that an investigation was started and it was discovered that when steel contains between 2 and 6 per cent. of manganese it is so brittle it can be powdered with a hand-hammer. After 6 per cent. has been passed the brittleness gradually disappears until 12 per cent. is reached, when the former strength returns and reaches its maximum at about 14 per cent.

The manganese steels that are now manufactured contain from 8 to 15 per cent. of manganese. When heat-treated by methods radically different from that ordinarily given steels they make the toughest product that is known to the steelmaker's art. They have exceedingly good wearing properties, especially when working in gritty mineral substances. For this reason large quantities are used for points on the dippers of steam shovels, screens in ore-crushing plants and for other similar work. It has never been used for manufacturing into automobile parts, as other steels are better for this purpose.

Until within the last 2 years this steel could not be rolled, forged, hammered, or pressed into merchandizable shapes, but was always manufactured in the form of castings. These are so tough they cannot be cut with any kind of machine tools, but when a finished surface is desired they must be ground with emery wheels. A tensile strength of 140,000 pounds per square inch has been obtained with an elongation of 45 per cent.

Within the last 2 years, however, a method of heat-treating was discovered and patented that enabled it to be rolled, forged and mechanically worked into thin sheets, or bars, and hence it is being used in many new fields.

Plunger Pumps and Their Ills

Plunger pumps are used for increasing pressure in the gasoline tank so that the feed to the carburetor may be made more certain in ascending a steep hill. These pumps are generally fitted near the driver's seat, where they can be most readily reached. It will occasionally be found that the pump will leak very badly. This is generally due to the fact that the leather washer on the plunger has become hardened. When the pump is used for placing additional oil in the crankcase this leak does not occur because the action of the oil on the leather keeps it soft and pliable and prevents hardening. The remedy in the case of the gasoline or other plunger pump is to remove the cap of the pump and withdraw the plunger. Place the entire leather part in a bath of castor oil and allow it to remain there overnight. The plunger is then worked in the hands for a short time until the leather is found to become very pliable. The plunger is then replaced in the barrel of the pump and it will be found that the leak will be effectually stopped.

There is one other part of the plunger pump which is apt to give trouble and that is the ball check-valve. This is liable to stick and should be kept clean. Any soft dirt will give rise to this trouble and it is found that this trouble will be the greatest in the oiling system. In most cars where plunger pumps with ball check-valves are used the valves are now being made with very small seats so that the chances for sticking are very slight and this trouble, which was once very prevalent, is now disappearing. Gear pumps very rarely give leaking troubles, and, if they should, it may be stopped very readily by renewing the packing. Owing to the principle upon which the gear pump works, there is a very small amount of wear. The rotating shaft by means of which the gear pump operates is more readily kept tight than is the reciprocating shaft of the plunger pump.

Testing Muffler Cut-Out

Results of Trials at Packard Factory Demonstrate That There Is But Little Power Lost Through the Muffler

Average Gain Without Muffler Ranges From $1\frac{1}{2}$ to $2\frac{1}{2}$ Horsepower

IN connection with agitation in favor of the abolition of the muffler cut-out several tests have been made of late in order to determine the actual loss of power by the attachment of the muffler. The tests, which were recorded in a previous issue of THE AUTOMOBILE, showed that the difference in power developed with the muffler on and with the cut-out open was very small. The tests made by the Packard Motor Car Company at its Detroit laboratory with a 30-horsepower motor were without a cut-out, the muffler being merely removed from the line. In this way a higher horsepower is developed than with a cut-out attached.

In the accompanying diagram the power curve labeled 1 represents the results attained with the muffler attached to the motor. Curve 2 is taken with a straight 3-inch pipe 7 feet in length, and curve 3 is taken with the muffler detached from the line altogether. The upper curves in the diagram show the calculated mean effective pressures corresponding to the horsepowers developed in curves 1, 2 and 3.

The results of the test are given in the following table:

| Revolution per min. | Horse-power with muffler attached | Horse-power without muffler | Horse-power difference: | | Corresponding speed miles per hr. |
|---------------------|-----------------------------------|-----------------------------|-------------------------|---------|-----------------------------------|
| | | | Less | Greater | |
| 500 | 23.7 | 21.5 | 2.2 | ... | 17 |
| 600 | 27.8 | 26.2 | 1.6 | ... | 20 |
| 700 | 31.7 | 31.2 | 0.5 | ... | 23 |
| 800 | 33.8 | 36.0 | ... | .2 | 27 |
| 900 | 38.9 | 40.0 | ... | 1.1 | 30 |
| 1,000 | 41.6 | 43.0 | ... | 1.4 | 33 |
| 1,100 | 44.2 | 45.6 | ... | 1.3 | 37 |
| 1,200 | 46.6 | 48.2 | ... | 1.6 | 40 |
| 1,300 | 48.1 | 51.0 | ... | 2.9 | 43 |
| 1,400 | 49.2 | 53.4 | ... | 4.2 | 47 |
| 1,500 | 50.7 | 54.7 | ... | 4.0 | 50 |
| Total Ave. | 41.0 | | | 1.13 | |

From this table it can be seen that the average difference in power gained by removing the muffler varies between 2.3-4 and 1.1-8 horsepower. The removal of the muffler gives the same results as a cut-out having an efficiency of 100 per cent. The differences in power caused by using the cut-out will be even less than those shown in the curves and tabulation.

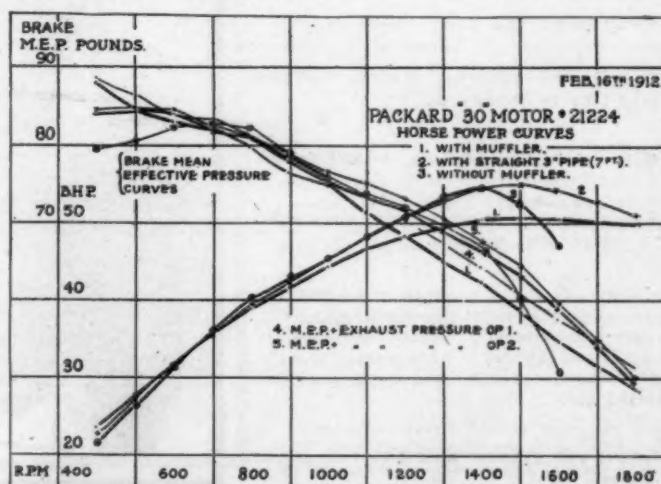


Fig. 2—Curves illustrating the difference in horsepower with and without muffler. Mean effective pressures also shown



Fig. 1—Front View of the 1913 Peerless 60 Six

Besides Carbureter and Ignition Changes, the Peerless Line for Next Year Shows Several Minor Refinements

PEERLESS has come out with its 1913 car and already one or two of the new models are on exhibition in its branch salesrooms. Five models will be built, in 1912, the 24 Four, the 40 Four, the 38 Six, the 48 Six and the 60 Six. The 24 Four is made only as a town car. As the automobile has been so far perfected that striking changes in design are uncommon, the only alterations in the 1913 Peerless are of a minor character. These changes are enumerated below.

The bore and stroke of the motors of the various models are the same as in the 1912 car, as are the other specifications. These are:

| Model | Bore | Stroke | Wheelbase | Front tires | Rear tires |
|---------|------|--------|-----------|-------------|------------|
| 24 four | 4 | 4½ | 113 | 34 x 4½ | 34 x 4½ |
| 40 four | 5 | 5½ | 125 | 36 x 4½ | 37 x 5 |
| 38 six | 4 | 4½ | 125 | 36 x 4½ | 36 x 4½ |
| 48 six | 4½ | 6 | 137 | 36 x 4½ | 37 x 5 |
| 60 six | 5 | 7 | 140 | 38 x 5½ | 38 x 5½ |

Mechanical Changes

Damper, or butterfly, throttle replaces piston type in carbureter.

Gear-driven fan gives way to belt-driven.

Bosch dual ignition system supersedes two independent systems.

Lighting dynamo is driven from the fan shaft instead of from the pump shaft.

Made-up bus-bar is used in place of vulcanized bar.

Intake and exhaust manifolds changed to T-shape.

Heavier shackles on the front springs.

All motors are of the long-stroke type and the design has been altered in only a few particulars. The changes made apply to all the models. The cylinders are still of the T-head type, cast in pairs, the water-jackets being large and tapered so that the greatest amount of water is at the top of the cylinders, the point at which the temperature is highest. The valves are of the poppet variety as in all Peerless cars and are ample in size to permit the gases to enter and leave the cylinders rapidly and easily. The pistons are the same as those used in the 1912 models, as are the connecting-rods, crankshaft, camshaft, fly-wheel, etc.

The water pump is unchanged, the water being forced into the base of the water-jackets on the exhaust side of the motor, which is the side where the heat is greatest, and then out at the top of the cylinders to the top of the radiator. This is of the horizontal tube-and-fin design, auxiliary cooling being supplied by the fan situated behind it. Heretofore the Peerless has been using a gear-driven fan, but the belt-driven type has been adopted for use on the 1913 cars. The belt is of elkhide and is built up, that is to say, it is made up of small pieces of hide

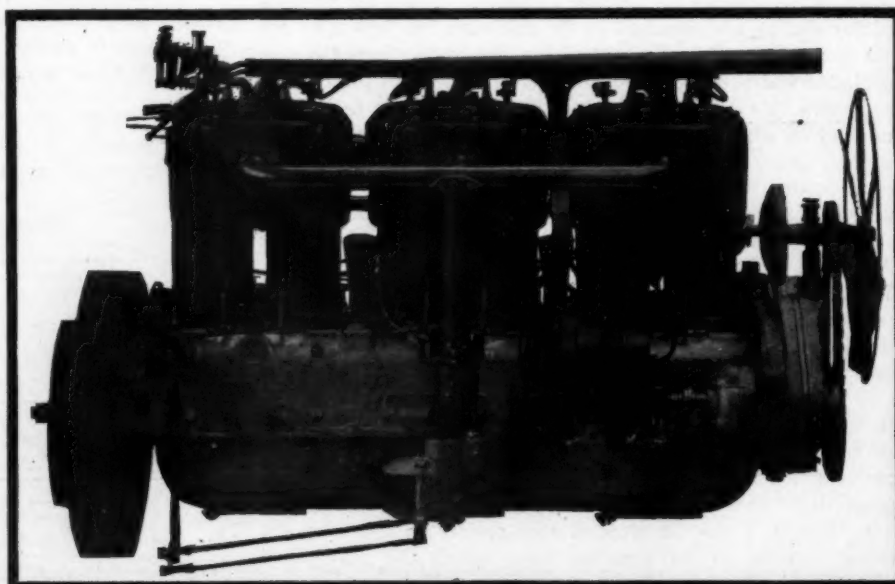


Fig. 2—Intake side of 48 Six motor showing T-shaped manifold, dash carburetor control, new type bus-bar and belt-driven fan.

riveted together so that they overlap, thus preventing slipping.

The intake and exhaust manifolds have been redesigned in the 1913 cars, the inlet being made in straight T-shape, as shown in the illustration, thus doing away with the curves around which the gases formerly had to travel on their way from the carburetor to the cylinders and at the same time giving the motor a neater appearance, while the exhaust pipe has been enlarged to 3 1-2 inches in diameter and retains this dimension throughout its entire length. Moreover, the exhaust is also changed to the T-shape, the former practice having been to run it straight back from the rear cylinder to the muffler. The joints in the exhaust pipe allowing for the expansion and contraction of the metal caused by the heating and cooling to which it is subjected are retained in the 1913 cars.

The splash system of lubrication with the sight-feed on the dash is continued, one of the leading features in its arrangement being that the rod controlling the three drain-cocks at the bottom of the crankcase is fitted with an operating handle which allows the bonnet to be closed only when the drain-cocks are properly closed, thus preventing the driver from running the car while open drain-cocks are distributing the oil from the crankcase along the highway. In the same way, when the bonnet is down the drain-cocks cannot be accidentally opened from underneath by flying sticks or stones, as the handle strikes against the closed bonnet and cannot move farther.

As already mentioned, a pronounced change has been made in the ignition system, the Bosch dual system being installed in place of the double, or two independent, system formerly in use. This does away with one set of spark-plugs, and, consequently, with one set of wires and the battery distributor with its bevel-gear drive from the camshaft. The Peerless designers found, on investigation, that the magneto being as dependable a piece of mechanism as can be constructed, the magneto system is in use 99.9 per cent. of the time and that the battery plugs become

carbonized during their long periods of idleness and do not work efficiently when called upon. Under these conditions the benefit derived from the double system by no means compensates for the complications which it entails. By giving it up in the 1913 cars the Peerless eliminates superfluous weight and also simplifies the ignition immensely. Another change in the ignition system is the adoption of a made-up bus-bar in place of the vulcanized bar used for several years in the Peerless. The new bar has an arm extending down almost to the magneto, which protects the magneto wires. The whole arrangement is lighter and more compact than was the old bar and on that account permits of a less conspicuous and neater mounting over the tops of the cylinders between the spark-plugs and the cylinder water outlet. This makes the motor parts on the intake side more accessible and two connections in each lead from the magneto to the spark-plugs are eliminated. The electrical efficiency of the conductors is increased by perfected insulation and any conductor can be replaced without replacing the entire unit.

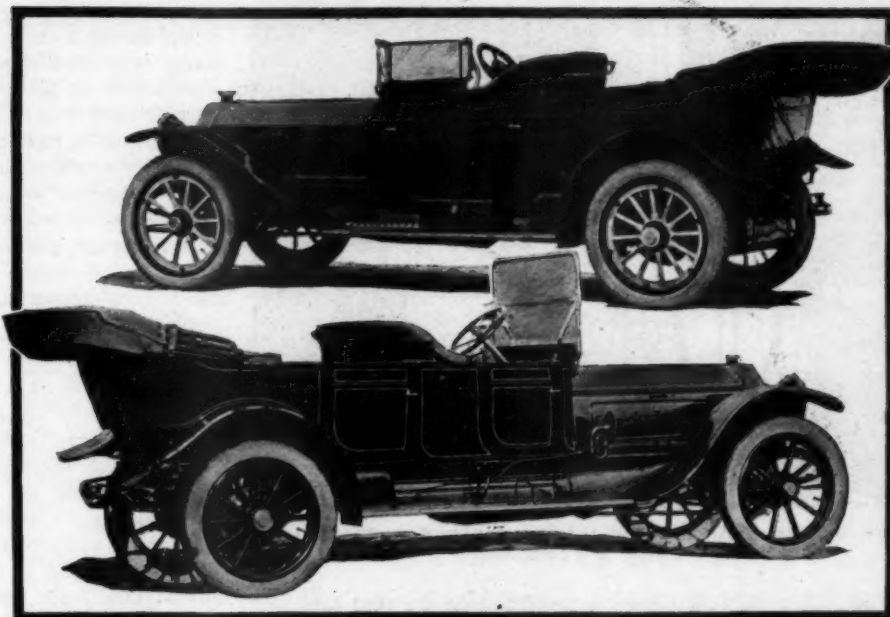


Fig. 4—Upper, 1913 48 Six with torpedo body. Lower, 60 Six touring car

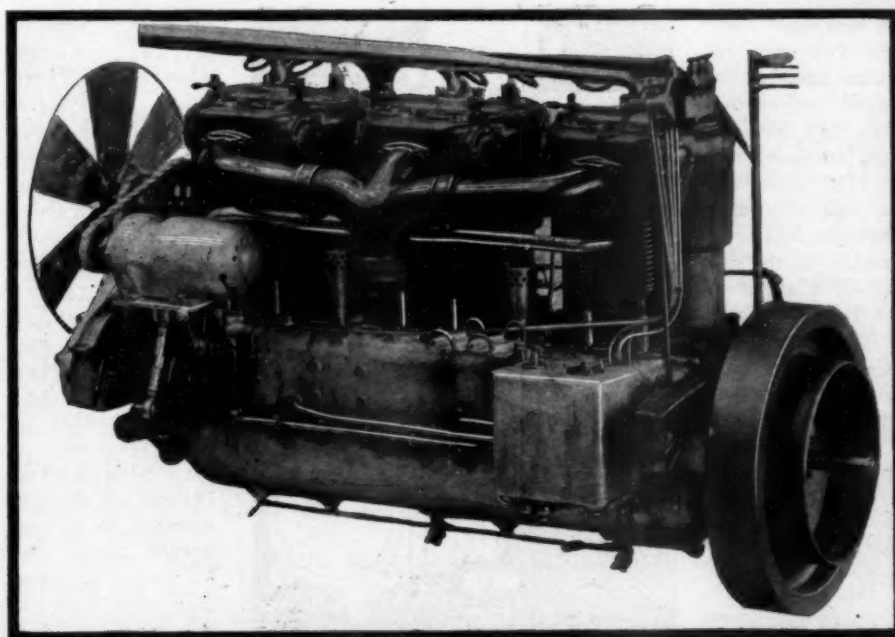


Fig. 3—Exhaust side of 48 Six motor showing new mounting of light dynamo T-shaped exhaust manifold and oil-can brackets

Body Changes

Adoption of domed side lights set in the dash. This leaves the body lines smooth and unbroken in their sweep above the bonnet. Moreover, the new lamps are neater and more compact than the old type.

Windshield stays turned back to the parapet instead of slanting forward across the bonnet. The stays themselves are made much shorter and lighter by this change and the car's appearance is improved.

Hollow in running-board for extra tires. This keeps them from breaking the parapet line of the body. It also makes the lines more secure than if resting on a flat running-board and lessens the strain on them.

Leather-covered toggle rest for holding the four top-bows compactly. The result of this little arrangement is that the lines of the bows and the top itself blend with the gradual rise of the parapet at the rear.

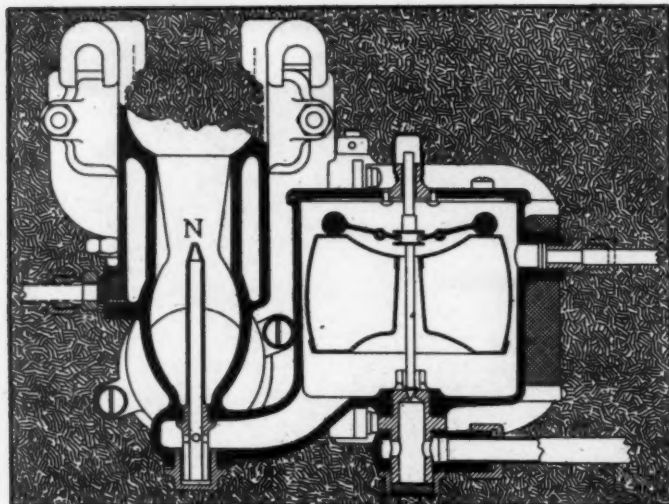


Fig. 5—Cross section of float-chamber and mixing-chamber of Peerless 1913 carburetor

The electric lighting system is continued on the 1913 cars, the current being supplied by the Gray & Davis dynamo and auxiliary storage battery as in the 1912 models, the only change being that the dynamo is located just behind the fan on the left side of the motor and driven by a belt and pulley from an extension of the fan driveshaft instead of being from the pump shaft. With this arrangement its speed is greater as compared to that of the crankshaft, so that it becomes effective for charging the storage battery or supplying the lights at 8 miles an hour car speed, instead of at 12 miles an hour car speed as formerly, and the capacity of the lighting system is increased. The oil and gasoline cans are mounted on a bracket in front of the oil reservoir.

The power transmission system is unaltered in the new cars, the energy being transmitted from the motor through an expanding shoe clutch, with cork inserts, which is extremely simple in design and readily accessible and adjustable. A double universal joint is employed between the clutch and gearbox, which is carried on the sub-frame in the center of the chassis, thus facilitating the removal and replacement of the latter and providing for the taking up of side motions and twistings of the frame. The gearbox is as light and compact as is consistent with strength and durability and has both shafts in the same horizontal plane, mounted on annular ball bearings. Four speeds forward and reverse are used as before. Two universal joints are provided on the driveshaft, one at each end. As in the 1912 cars, crosses on each end of the shaft mount two rollers of large diameter which roll in two yokes, thus reducing friction and consequent loss of power. By simply removing one set-screw the entire joint may be taken apart. The joints are protected from dust by a telescoping leather and aluminum cover which also acts as a grease retainer. The rear axle is of the floating type, arched and trussed. The weight of the car is carried solely by the outer axle. The power is transmitted from the bevel gears to the wheels by means of live axle shafts operating clutch plates in the rear wheel hubs. The arched construction which increases the rigidity of the axle also admits of the use of dished wheels, cambered outward 2 degrees, so that the lower supporting spokes are always normal to the road surface. Distance rods are attached to both frame and rear axle on either side by ball and socket joints and are adjustable. The propelling force of the rear wheels is exerted through these distance rods. These, together with the torque rod, relieve the springs from all duty except that of supporting the weight of the body. The front axle is of the I-beam type, dropped between the springs.

The brakes are of the same size and style as in the 1912 cars, as are the wheels, rims and tires. The use of the drop frame adopted by the Peerless several years ago is continued, this

type having been found to insure comfort and safety as it brings the car's center of gravity near the ground without interfering with road clearance. The method of spring suspension is the same as in the 1912 models, the characteristic platform spring construction in the rear being retained. The front spring shackles have been made heavier. The irreversible steering column used in this year's cars is continued in the 1913 product together with the same provision for the elimination of road shocks from the steering wheel rim. The same large-diameter wheel with finger notches is used. Right-hand control is retained, the levers being situated inside the right foredoor of the driver's compartment.

New Carburetor Design for 1913

The carburetor is a new Peerless design for 1913. It is situated inside the side member of the frame and the length of the inlet pipe to the intake manifold affords opportunity for improved volatilization of the gases. The carburetor and part of the inlet pipe are water-jacketed. The piston throttle formerly used gives way to one of the butterfly, or damper, type, thus doing away with the tortuous course which the gas was obliged to follow in the earlier styles and permitting a direct line of flow from the carburetor to the intake manifold. The new arrangement adds flexibility to the control of the motor by allowing a less pronounced opening and closing of the throttle at low speeds as a result of an equal movement of the steering column hand lever or the accelerator. When wide open, the new throttle offers less obstruction to the passage of the mixture from the carburetor to the explosion chamber than was the case with the old type. The accompanying illustrations show the new carburetor in detail. Fig. 5 is a cross-section of the float-chamber together with the base of the mixing-chamber. The spray-nozzle is shown at N in this figure, as well as in Fig. 6, which is a cross-section of the water-jacketed mixing-chamber including the new butterfly throttle T, which is depicted in a wide-open position. The air intakes are shown at the right of this illustration, a cross-section of them being given in Fig. 7, in which S is the main intake, the valve V₁ and the spring S₁ operating at all speeds, while Z is the auxiliary intake, the valve V and the spring Z₁ automatically coming into use at high speeds. As shown, the air intakes are screened to prevent dust and other foreign matter being drawn in with the air.

There are some slight departures from the 1912 body designs in the new cars. One marked change is the adoption of dome

side lights set in the dash in place of the bull's-eye type. These have been made an integral part of the body design and preserve the sweep of the body lines above the bonnet smooth and unbroken. The domes are of ground glass and fit harmoniously into any color treatment. Another change consists of a rearrangement of the windshield stays. Instead of slanting forward in a long stretch across the bonnet surfaces, they turn back to the parapet, furnishing convenient handles for any-

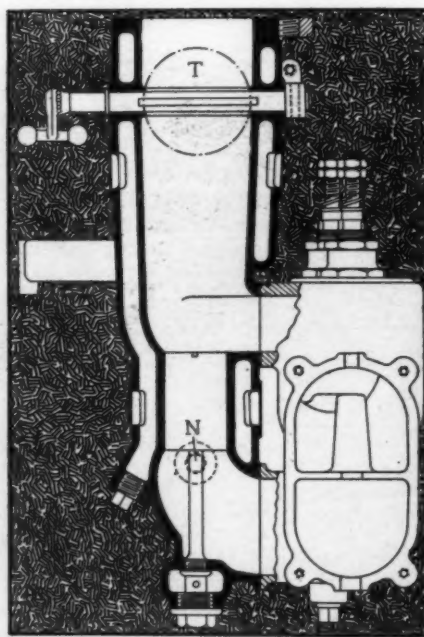


Fig. 6—Showing new butterfly throttle and direct path of gas through mixing-chamber

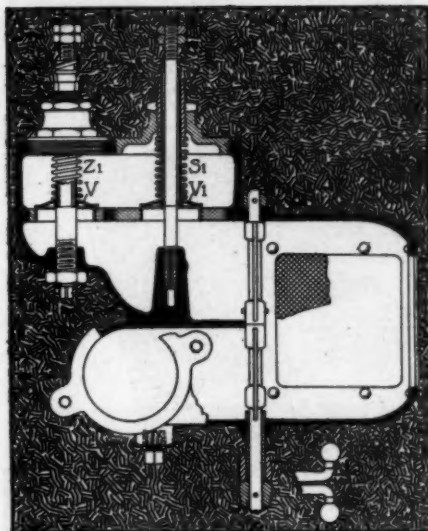


Fig. 7—Sectional view of air intake, indicating screen to keep out dirt

one entering the front compartment. The new rods are shorter, lighter and neater than the old type. The designers have endeavored to keep the parapet line of the body as nearly unbroken as possible in the 1913 cars and, with this aim in view, have fashioned a hollow in the running-board into which the extra tires are set, the drop being sufficient to keep them from extending above the top body line. As before, the chair seats

in the tonneau fold down out of sight and, when the top is down a toggle rest covered with leather holds the four bows compactly in such a manner that they continue the gradual elevation of the parapet at the rear.

The equipment is the same as that furnished with the 1912 cars and consists of a Peerless mohair four-bow top, unlined, with storm curtains and dust cover, a single-folding glass windshield, dynamo electric lighting system, the four-cylinder, mechanical air pump for inflating tires, coat rail and foot rest, locks for the ignition switch, tool-box and tires, and the regular tool equipment.

The standard body types include the touring car, torpedo, landaulet, limousine and Berline-limousine. The roadster and coupé are fitted only to the 38 Six chassis. The prices of all the models are the same as for the 1912 cars except that \$200 has been added to that of the 38 Six as the company has found that it cannot profitably construct this type for \$4,000, the 1912 price.

The Trend in Steel Production

While an analysis of the figures shows that the total steel production in the three principal metallurgical countries, the United States, Germany and England, has been doubled during the decade from 1900 to 1910, the Bessemer output has fallen from 38 per cent. of the total to 23.8 per cent., and the open-hearth production has risen from 40 per cent. to 57. Thomas converter steel has lost a little ground, comparatively, representing 19 per cent. against 21.3 per cent. 10 years ago. Among the open-hearth methods it is the basic process which has made all the gains. Basic open-hearth steel now makes up 48.3 per cent. of the total steel production, leaving only 8.9 per cent. for acid open-hearth steel.

A tendency is noted toward coupling furnaces of different systems, making the fused metal pass from one to another and thereby ridding it of its impurities more perfectly than before. Thus a Bessemer converter is coupled with an open-hearth furnace or with an electric furnace, and an open-hearth furnace is coupled with an electric. The extra cost is made up not only by better quality but also through the ability to run four to five times as many melts through the open-hearth or the electric furnace as if they were used alone for the reduction of the raw material.

Among the special steels, the titanium steel made in America for rails has caused much talk, but it has not as yet entered largely among the alloys contemplated for automobiles, and the same may be said of the new methods for casting manganese steel.

Calendar of Coming Events

Shows

- April 29-May 4.....Burlington, Vt., Annual Show, State Armory, Burlington Merchants Protective Association.
- May 6-11.....Philadelphia, Show and Carnival, Belmont Race Track, Narberth, Pa., Belmont Motor Club.
- June 17-22.....Milwaukee, Wis., Convention and First Annual Show, National Gas Engine Association.
- June 27-29.....Detroit, Mich., Summer Meeting of the Society of Automobile Engineers.
- July 10-20.....Winnipeg, Man., Canadian Industrial Exhibition.
- Sept. 23-Oct. 3.....New York City, Rubber Show, Grand Central Palace.

Race Meets, Runs, Hill Climbs, Etc.

- April 13.....New York City, Truck Parade, Motor Truck Club.
- April 14.....San Jose, Cal., Track Races.
- April 27.....Los Angeles, Cal., Speedway meet, Motordrome.
- April 27.....Philadelphia, Pa., Annual Roadability Run, Quaker City Motor Club.
- May 4.....Atlanta, Ga., Hill Climb, Atlanta Automobile and Accessory Association.
- May 4.....Santa Monica, Cal., Annual Road Race, Motor Car Dealers' Association.
- May 14-17.....Chicago, Ill., Commercial Vehicle Test, Chicago Motor Club.
- May 17-18.....Denver, Col., Track Meet, Colorado State Automobile Association.
- May 30.....Indianapolis, Ind., Speedway, 500-mile race.
- May 30.....Salem, N. H., Track Races, Rockingham Park.
- June 8.....Narberth, Pa., Track Races, Quaker City Motor Club.
- June 20.....Algonquin, Ill., Annual Hill-Climb, Chicago Motor Club.
- July 3-5.....Belle Fourche, S. Dak., Second Annual Track Meet.
- July 4.....Petersburg, Ind., Track Meet.
- July 4-5.....Taylor, Tex., Track Meet, Taylor Automobile Club.
- July 4-6.....Old Orchard, Me., Beach Meet, Old Orchard Automobile Association.
- July 15.....Milwaukee, Wis., Reliability Run, Wisconsin State Automobile Association.
- Aug. 8-10.....Galveston, Tex., Beach Meet.
- Aug. 23-24.....Elgin, Ill., National Stock Car Races, Chicago Motor Club.
- Sept. 2.....Indianapolis, Ind., Track Races, Speedway.
- Oct. 5.....Philadelphia, Pa., Annual Fairmount Park Road Race, Quaker City Motor Club.
- Oct. 7-11.....Chicago, Ill., Reliability Run, Chicago Motor Club.
- Oct. 12.....Salem, N. H., Track Meet, Rockingham Park.
- Nov. 6.....Shreveport, La., Track Meet, Shreveport Automobile Club.

Foreign

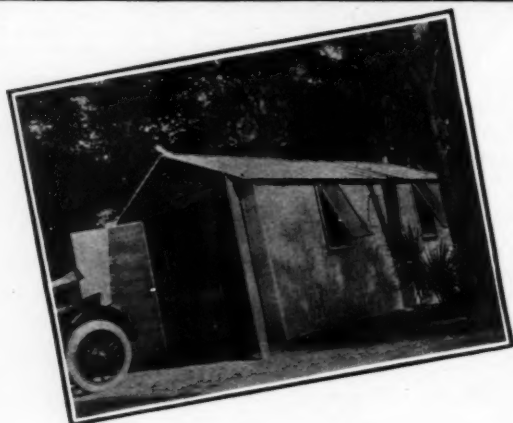
- May 26.....Barcelona, Spain, Cup of Spain Road Race, Automobile Club of Catalonia.
- June 25-26.....Dieppe, France, Grand Prix de France, Automobile Club de France.

Following the Harveyizing process, the Krupp method for casehardening has fallen into the public domain, and the tendency is now among the makers to abandon casehardening in favor of hardened homogeneous steels. The Krupps are working with a nickel-tungsten alloy said to give a hardness equal to that of a casehardened surface and much less brittle, and in England, too, a steel with 4 per cent. of nickel and 2.5 per cent. of tungsten is under trial.

The use of traveling cranes with electro-magnetic hoists is finding its way into the steel industry in general, saving considerable labor through the avoidance of the hooking and unhooking of loads, contributing to cleanliness in the shop by prompt removal of wastes and tending to an economical disposal of such waste material rather than to indiscriminate scrapping. Magnets weighing 2 tons carry loads of up to 5 or 6 tons.

In the rolling mills the trains are being electrified, resulting in better work, and some new structural shapes, one of which is the Z-shape, said to exceed the U-shape in strength by 36 to 70 per cent.—From *Revue Pratique*, March, after *Echo des Mines*.

Automobiles for Japan—It is stated on the authority of the German consul at Kobe that openings for business motor vehicles in Japan have much improved, as both state and communal authorities, as well as transport companies, intend to employ them for the carriage of passengers and goods. The vehicles should be capable of hard wear, as the roads in the mountainous districts are very bad and there is a scarcity of experienced chauffeurs and mechanics. On account of the narrow streets cars should have short and narrow bodies, easily steerable front wheels and strong brakes.



Neat garage offered by Mershon & Morley
Sectional metal garage of the Pruden type



Another example of the Pruden type in Florida
Cornell type suitable for storing a touring car

The Portable Garage

(Continued from page 869.)

rates are reduced and the risk of fire made much smaller. When so placed the tank should be on a platform off the ground so as to allow for the easy drawing off of the fuel, which may be piped through the garage-wall into the garage. Or there may be a simple faucet at the tank, the operator filling the machine from the outside. The latter method is the least dangerous of the two.

Such tanks for surface storage may be had for holding from 15 gallons to 300 gallons, although the tank which has a capacity for 60 gallons, and which costs about \$25, is the best for the average installation.

By far the best and most approved method of storing gasoline is by means of the underground system, many makes and forms of which are on the market. Of course, underground gasoline storage gets away from the portable idea somewhat, but if the owner has erected his garage with some idea of permanency and can afford the additional expense, such an outfit is to be recommended.

In its usual form there is a specially constructed tank made of prepared iron and painted so as to resist corrosive action. From this storage tank, which is buried to a depth of 3 to 5 feet in close proximity to the garage, a pipe leads to a pump inside the building so that the gasoline may be pumped from this artificial well directly into the tank on the car. There is no waste of the fuel by this method of storage, as all the gasoline which is not used flows back into the underground tank again.

Another pipe from the tank is brought to the surface of the ground for filling the storage tank, making the replenishing of the supply a very simple matter. Such outfits may be had at a cost of \$45 to \$100, depending on the size of the storage tank and the kind of pump used. In the more elaborate outfits the pump registers the amount of gasoline discharged.

Suitable cans for the storage of lubricating oils should not be forgotten, their cost being very small in comparison with the service which they give. Galvanized iron is the best material for their construction.

Like any other garage building, the portable should be set up with the idea of making it an addition to the scenic effect of the property on which it is located, rather than a mere box set up with no idea of appearance. When no regard is given to the ornamental side of the matter, the garage is apt to become a mere eyesore, which has the appearance of even being ashamed of itself. The portable garage can be made useful and ornamental as well. Vines and shrubs are too easily planted and grown to be omitted from the landscape scheme of which the garage, however small, is a part.

Subsidize Venezuela Motor Lines

MARACAIBO, VENEZUELA, March 20—Government subsidies have been offered for several automobile lines which are desired to penetrate certain outlying districts. One line which has been operating for the past year has resulted in great good to this place and furnished a ready means for the transportation of coffee. The city has just appropriated the funds necessary for repaving a number of the principal streets with asphalt. There are a number of pleasure cars owned here.

Ready-Made Homes for the Automobile

How They Are Constructed and Where They May Be Purchased

Metal, Wood and Combination Structures Easily Erected and Low in Price

FOR the intending purchaser of a portable garage, the following details of buildings of this class which are on the market are of value. Almost without exception, garage manufacturers advise THE AUTOMOBILE that they are in a position to make shipments of their products within a day or two from the time the order is received.

Butler Manufacturing Company, Kansas City, Mo.—Fireproof garages are manufactured. The entire construction is of sheet steel, with the exception of the frame, which is of wood. This wooden framework, however, is covered both inside and out with the sheet metal, and the building is therefore rendered fireproof. For the 10 by 16-foot size, \$155 is asked, and for the larger size, 12 by 18 feet, \$180.

Edwards Manufacturing Company, Cincinnati, O.—The Edwards fireproof construction utilizes wooden frame members, the sides and ends being covered with galvanized steel weather-board. The roof is made of pressed steel shingles in sheets. The prices range from \$72.50 for the 10 by 14-foot size to \$87.50 for the 10 by 20-foot size.

Gordon Manufacturing Company, Middletown, O.—No wood is used in this portable garage. The construction is all metal, riveted and bolted together. Gusset plate reinforcements are used at the corners. The metal used for the side and end walls is corrugated iron. The smallest size, which is 12 by 12 feet, costs \$155, while the large double affair, measuring 16 by 24 feet, can be had for \$280. The intermediate sizes are at proportionate prices.

O. K. Harry Steel Company, St. Louis, Mo.—In this garage, galvanized open-hearth steel, which is reinforced with corrugations and angle iron, is used throughout. The siding metal sections are fastened to a steel frame, which is bolted together and well braced. The price of the 10 by 13-foot size is \$120, and of the largest size (20 by 20 feet), \$269.

The R. L. Kenyon Company, Waukesha, Wis.—Specially prepared canvas which is rendered waterproof and fireproof covers the sides and roof of the Kenyon portable garages. The wooden framework is furnished cut to size, and is designed to be easily set up, the joints being secured by means of wing nuts. The prices for this type of building vary from \$54 to \$100.

Mershon & Morley Company, Saginaw, Mich.—The M&M garages are made of white pine, and come to the purchaser with one coat of priming paint outside. The sections are reinforced by frame pieces, and no separate frame is used. The sections are fastened together with bolts and screws, no nails being necessary in setting up the building. The prices range from \$139 for the 9-foot 6-inch by 12-foot 8-inch size to \$409 for the 19 by 22-foot size. There is also a small garage for the runabout, which measures 9 feet and 6 inches square, and which the company sells for \$117.

The Metal Shelter Company, St. Paul, Minn.—The Pruden system of construction is utilized in the garages of this make. No framework is required, the sections being so fastened

together by means of studs that the walls are amply strong. The sheet metal sections are pressed into shapes to represent stone, brick or framework. No wood is used in the construction, making it absolutely fireproof. The prepaid prices east of the Rocky Mountains are quoted as \$160 for a 10 by 12-foot garage and \$340 for an 18 by 20-foot one, which is large enough for two machines.

F. C. Pinyoun & Son, Cleveland, O.—Garages of this make come in a variety of shapes and styles, one of the latest of which is made to represent a timber and concrete construction of the English type. The lower section is furnished with a metal sheathing made to resemble a stone foundation, while the roofing metal is furnished in representation of tiling. The eaves are made wide and overhanging. Well-seasoned lumber is used in these buildings. The cost varies with the type of building, and, therefore, no standard prices can be furnished.

J. S. Rogers Company, Moorestown, N. J.—This firm is making a specialty of a 12 by 20-foot garage of fireproof construction. It sells for \$175 to \$200, depending on the frame covering. There is a separate frame made of steel angle iron, braced. To this the side sections, which are either corrugated steel or steel clap-board material, are fastened. The roof is made of either corrugated steel or steel crimped stock. The sheathing is nailed to the frame by means of galvanized wire nails. A small garage measuring 10 by 16 feet runs from \$135 to \$150.

Ruby Manufacturing Company, Jackson, Mich.—In this construction there is a separate steel angle iron frame, which is chipped ready to bolt together. The steel sections, which are fastened to this main frame, are reinforced by having rectangular angle iron frames electrically welded to them. No wood is used in the construction.

Southern Portable House Company, Jacksonville, Fla.—Properly seasoned southern pine and cypress are used in the construction of the garages of this make. Either wooden siding or steel sheathing is furnished at the option of the purchaser, and there is a wide range of sizes. The usual sectional principle is adhered to.

Springfield Portable House Company, Springfield, Mass.—The sectional idea is not so pronounced in the garage designs by this company. In all buildings of dimensions under 11 by 15 feet, each of the walls comes in a single section, and the roof in two sections. But in sizes above this, the walls and roofs are made in several sections. By this method of using few sections, few joints are necessary. Two-inch cypress frames are used for the support of the side and end wall sections. The corners are fastened together with lag screws, making these joints water and wind-proof. In making the sections a good quality of building paper is first stretched over the reinforcing frames, and the cypress or red cedar siding is then nailed over this lining. A substantial ridge pole covers the joint of the two roof sections, which are constructed in the same way as the side walls. The company sells its smaller garage, measuring 9 by 12 feet, for \$135 and its largest type, which has dimensions of 18 by 40 feet and which is large enough for two cars, for \$900.

The Wyckoff Lumber and Manufacturing Company, Ithaca, N. Y.—Except for its one size of fireproof garage, which measures 12 feet 5 inches by 19 feet 6 inches and which sells for \$387.50, the Cornell portable garages made by this company are all made of wood and are sectional in construction. In these latter types, any size from the 9 by 12-foot garage at \$127.50 to the 18 by 24-foot one at \$351, may be had. The size and end wall sections are of pine siding, V'd, tongued and grooved and surfaced on two sides. Roof sections, which are held together by bolts on the under side, are covered on the weather side with a heavy grade of roofing material. The fireproof model is constructed of metal, which is covered inside and out with asbestos, making it fire and water-proof.

AUTOMOBILE

Vol. XXVI

Thursday, April 11, 1912

No 18

THE CLASS JOURNAL COMPANY

Condé Nast, President

C. R. McMillan, Vice-President

E. M. Corey, Treasurer

W. I. Ralph, Secretary

231-241 West 39th Street, New York City

BRANCH OFFICES

Chicago—910 South Michigan Avenue
Boston—1035 Old South BuildingDetroit—827 Ford Building
Cleveland—309 Park Building

EDITORIAL

David Beecroft, Directing Editor

George M. Schell
J. Edward Schipper
D. McL. LayJames R. Doolittle
Hans Weyss
L. V. Spencer

BUSINESS

C. R. McMillan, General Manager

N. H. Van Sicklen, Jr., Office Manager

ADVERTISING

W. I. Ralph, Manager

L. G. Vogel, New York
F. B. Barnett, Cleveland
W. S. Young, BostonC. H. Gurnett, Chicago
F. J. Robinson, Chicago
C. K. Brauns, DetroitCable Address ----- Autoland, New York
Long Distance Telephone ----- 2046 Bryant, New York

SUBSCRIPTION RATES

United States and Mexico ----- One Year, \$3.00
Other Countries in Postal Union, including Canada ----- One Year, 5.00
To Subscribers—Do not send money by ordinary mail. Remit by Draft,
Post-Office or Express Money Order, or Register your letter.Entered at New York, N. Y., as second-class matter.
The Automobile is a consolidation of The Automobile (monthly) and the Motor
Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903,
and the Automobile Magazine (monthly), July, 1907.

Advent of Wire Wheels

THE season of 1913 will be characterized by the advent of the wire wheel for pleasure car work.

The detachable wire wheel, which has been exploited and used in England during the last 5 years, is getting a foothold in America and several of the leading car makers have quietly stated that they will give an option on either wood or wire wheels on their next year's models. It is a well-known fact that several companies have had wire wheels on test cars at the factories for the last 12 months and some of these companies are already making plans to manufacture their own wheels. Already one or two accessory companies have announced that they have wire wheels ready to market; and, to go still further, there are one or two demountable rim makers who have already adapted their rims to the wire spoke wheel. The thin edge of the wire wheel invasion has already been entered and its progress from now on will be watched with much interest.

The wire wheel is being introduced into America because of its two-fold merit. It is easier on tires than wood wheels and it is stronger. These are two good reasons for its introduction. The question of it being easier on tires was demonstrated in London several years ago when an official test was made of fifty taxicabs, twenty-five of which were shod with wire wheels and the other twenty-five with wood wheels. The tire wear on these fifty cabs was observed for a period of several months. All of the vehicles operated over practically the same streets

and in practically the same service. At the end of the test it was discovered that the wire wheel showed a tire economy of nearly 70 per cent. as compared with the wood wheel. The results were sufficiently convincing to attract widespread attention in Europe.

France was one of the most skeptical against the use of wire wheels. The wire wheels were English inventions and that was enough for proud France. In the early days of the wire wheel the English automobile racer wanted to have the permission to use the wire wheel in French road races, but the request was refused. France pinned her faith to demountable rims and would not even stoop to recognize the demountable wire wheel. Time changes many things and it worked a new idea into the susceptible Frenchman. He saw the merits of the wire wheel and last season lifted the ban on it for the big European road races. The wire wheel was received with open arms and won out. On one of the hottest days last year it demonstrated its economy on tires in a grueling road race by showing many additional miles of service. The Frenchman was convinced.

The big tire-economy merit of the wire wheel lies in the fact that the heat generated in the tire is immediately conducted out through the metal spokes, whereas, with the wood wheel, wood being a non-conductor of heat, the heat is all kept in the tire and rim by the heavy wood felloe, and as a result the tire temperaure is kept high and the de-vulcanization process is carried out, the tire weakens and a blowout follows.

Repeated tests have shown the great strength of the wire wheel. This was demonstrated at an English factory during the recent visit of several members of the Society of Automobile Engineers in England. The strength of the wire wheel has been demonstrated in several American cities where cars have skidded against the curb on slippery streets. In a recent experience of this nature the axle was damaged but the wheel withstood the shock, only one of the wire spokes being broken and no perceptible malformation worked.

In addition to reduced wear on tires and great strength, those who have had months of experience in driving cars with wire wheels claim a greater motor flexibility than with the wood wheel. They argue that the light rim weight of the wire wheel makes quicker acceleration possible and that the braking strain is also less. In a word, their experiences point to greater ease of operation on the motor, accomplished by reduction of weight at the rim of the wheels.

* * *

The Portable Garage

EACH succeeding season sees more attention given to the subject of the portable garage. To-day its merits have been realized by the man with money who is looking for convenience and also for the automobilist who is looking for a cheap method of garaging his car. The progress made in the design and construction of the portable house makes it possible for the most ordinary workman to erect the building without the aid of expert labor, and when once erected it is a weather-proof building suitable for housing the most palatial motor vehicle.

One of the large classes to which the portable garage is appealing to-day is the man who rents a summer cottage by the seashore, in the mountains or in suburban sections. Many of these summer homes are without garage facilities and the city car owner, who is moving countryward

with the sole object of getting more use out of his car is freed from the problem of renting a home with a permanent garage. While it is true that nearly every person owning his summer home builds a permanent garage, yet there are thousands of cases of renting and in all of these the portable garage solves the problem.

Although at its inception the field of the portable garage was considered in the country to be the town or suburban sections, yet to-day it has invaded the confines of the city and now it can frequently be found sandwiched in between sky scraper apartment buildings. It does not require much spare land to erect a small portable structure of sufficient size for one car, and, so long as these small land spaces remain in the city, so long will the car owner, living in a rented apartment, take advantage of them, partly for the convenience of having his car

garaged where it is handy and partly for reduced expense.

Accessory manufacturers have realized the field of the portable garage and have brought out fittings and apparatus specially suited for it. Gasoline and oil storage systems intended for it are on the market, and many makers are marketing light repair outfits which are finding places in these light structures. There are many car owners who take a delight and find recreation in working on minor repairs of their cars and to them the portable repair outfits that go well with such garages are bonanzas. Many car owners are yearly taking more and more interest in their machines. Some who used chauffeurs a few years ago are finding it better to drive their own cars, and this new personal interest in the machine is having its influence in broadening the field of the portable building.

Election Boosts Good Roads

Michigan Counties and Townships Vote Large Sums for Highway Improvement

GRAND RAPIDS, MICH., April 8—The recent election in this state did more for good roads in Michigan than anything ever before in the history of the commonwealth. The results were as follows:

Kent County voted to expend \$500,000 for good roads.

Ottawa County voted to expend \$600,000 for good roads.

Genesee County voted to expend \$500,000 for good roads.

Eaton County adopted the county road system.

Jackson County adopted the county road system.

Benzonia township, Benzie County, voted to bond for \$15,000 for good roads.

Homestead township, Benzie County, voted to bond for \$20,000 for good roads.

With its \$600,000 Kent County, including the city of Grand Rapids, will build 220 miles of road, a system having been worked out by the county road commissioners. The roads will earn from the state rewards aggregating \$100,000. If actual work can be begun July 1 it is possible that 25 or 30 miles can be constructed this year. The plan calls for a thorough system of trunk lines, an engineer and a general manager.

Along with the result of the election comes the announcement that the government will assist in good roads construction by sending an expert to look over the situation and make recommendations should the county so desire.

In Ottawa County the city of Holland promises to make a protest, but as the matter was properly carried at a legal election it is probable that the opposition will lose out.

Smallest State Has Best Roads

WASHINGTON, D. C., April 7—Rhode Island, the smallest state in the Union, with an area of only 1,250 square miles, is first of the states in its percentage of improved roads, according to the latest figures of the department of agriculture. Thus, apparently, it is not because of her small size that Rhode Island is able to boast of 49.14 per cent. of improved roads, for Delaware, with an area of 2,050 square miles, has only 6.22 per cent. of improved roads. On the other hand, Massachusetts, with an area of 8,315 square miles, has 49 per cent. of her roads improved, or very nearly the same percentage as Rhode Island. The size of the state, therefore, seems to have little or no effect on the percentage of improved roads.

New Way to Help Highways

Wisconsin Club Proposes to Sell Stock to Improve Suburban Roads

APPLETON, WIS., April 8—A novel plan of improving highways is proposed by business men and merchants of Appleton, Wis., who have organized the Outagamie County Good Roads Club, the object of which is to permanently improve and maintain every principal highway leading into the city of Appleton. The club will guarantee the return in full of all moneys levied against the county under the new Wisconsin state aid law. The plan is to dispose of 500 shares of stock in the club at \$5 each per year, the sale of stock to be divided or distributed in accordance with the use the stockholders make of the roads, and the proceeds of the sale will be devoted to aid the townships in Outagamie County in securing the return of the state aid moneys, the means being that the Good Roads Club will pay an amount equal to that raised by subscription among the farmers for the improvement of any highway leading into Appleton or in the direction of the county seat. For example, if the residents in a certain township raise \$500 by subscription for the improvement of a road, the club will pay an equal share, or \$500, for that certain purpose. Then, under the state aid law, the town will have to levy a tax of \$1,000, the county will be obliged to appropriate \$1,000 and the state \$1,000, making \$4,000 for the road, which will cost the township but \$500. The plan goes the state aid plan one better by splitting the cost of highway improvement four ways instead of three, as proposed by the highway aid law.

More Money for Pennsy's Roads

HARRISBURG, PA., April 8—As a result of the conference held by Auditor-General Sisson, Deputy Highway Commissioner J. W. Hunter, Chief Engineer Samuel D. Foster, of the state highway department, and Attorney General Bell and his deputies in Harrisburg this week, it is probable that close to half a million dollars, paid into the state treasury by counties as their shares of highway construction expense, will be made available for road construction. This money has been accumulating for some time. The general highway construction act of 1905 provided that part should go to the state, the rest to be divided between the county and districts benefited. The idea was that the counties should collect from the smaller districts and settle in 60 days. The accounts were not closely collected and the result was that the state treasurer had to start dunning.

Avoiding a Bad Stretch

Repair Work on Washington-Baltimore Route Necessitates Detour

OWING to rebuilding of 5 miles of the usual highway route between Washington and Baltimore, a detour is made necessary for present needs. This detour includes a turn to the left after leaving Hyattsville, returning at Beltsville.

The detour adds only slightly to the usual mileage. Another route is north to Norbeck and Olney; thence east to Laurel and to Baltimore via the usual route. Henry MacNair and J. F. Mixer, of the *Automobile Blue Book*, surveyed the respective routes, details of which follow:

Route Suggested by Henry MacNair

- 0.0 WASHINGTON, White House. Run east on Pennsylvania Ave., direct to New York Ave. Follow trolley through Massachusetts Ave. into "H" St. Go under middle span of railroad bridge 1.9.
- 2.9 Turn left into the Bladensburg Rd., passing under railroad 4.3.
- 6.4 BLADENSBURG. Turn left crossing iron bridge 6.8. Cross railroad at Hyattsville 7.3 and cross railroad at Beltsville 13.6.
- 15.5 At top of hill turn left on narrow road along edge of woods curving right at old church 15.6.
- 15.9 Turn left over railroad bridge at Muirkirk Sta. and immediately turn sharp right down grade along railroad.
- 16.5 Turn right, avoiding all left hand roads.
- 17.8 Three-corners, turn right, crossing trolley 18.6.
- 19.0 CONTEE. Turn sharp left in front of station into pike, which follow through Laurel 21.2, crossing railroad 23.5. Again cross railroad at Elkridge Sta. 31.9 and iron bridge over Patapsco River 32.2.
- 32.5 Left-hand road at store, turn sharp left—sign "Baltimore," crossing railroad 32.9. At store on right 33.2 turn left on "Rolling Road," avoiding right fork 33.4.
- 35.1 Turn right—sign "Baltimore, via Wilkens Ave." Go over railroad bridge 38.0 and follow trolley under railroad 38.8 into Wilkens Ave.
- 40.0 Turn left on Fulton St.
- 41.0 Turn right on Lafayette Ave. curving left across Fremont Ave. 41.6.
- 42.6 Turn right around church on Mt. Royal Ave. curving left at monument 42.7.
- 42.9 Turn right at Mar-del Garage into Charles St.
- 43.5 BALTIMORE, Washington Monument.

Another Route Suggested by J. F. Mixer

- WASHINGTON, Lafayette Sq., opposite White House. Start east, bearing slightly left into New York Ave.
- 0.3 Turn left on 14th St. following same to end of trolley.
- 4.3 Bear right on 14th Rd., jog left and right (4.5 m).
- 4.8 BRIGHTWOOD, 3-corners; turn right and next left into Georgia Ave., crossing railroad at SILVER SPRINGS (6.8 m).
- 7.2 Tollgate, pay 38c one way, 75c round trip. Trolley leaves to left 8.4 Show ticket at Wheaton 10.7, avoiding right 12.1 to Norbeck.
- 16.1 NORBECK, turn square right. Straight on is Route 673 to Frederick. Avoid right fork 9.4 leaving ticket at Sand Creek tollhouse. At Ashton 11.1 turn right around blacksmith's shop, bearing left at store in fork 13.5. At BURTONSVILLE 17.0 bear right with poles avoiding right fork 18.8. Schoolhouse in fork 19.8, bear left with poles turning right at irregular 4-corners 21.5. At next 4-corners turn left on 9th St. and next right across trolley into Laurel 22.6. Turn square and follow the same route as above.
- 46.5 Baltimore.



Detour to avoid road-mending between Baltimore and Washington

From the Hub to Gotham

Last Two Bad Places Between the Cities to Be Improved

BOSTON, MASS., April 6—Highway Commissioner Frank D. Kemp had a conference a few days ago with Selectmen F. B. Allen and John P. Hartigan, of Longmeadow, Mass., as a result of which it is believed that the last stretches of bad road between Boston and New York will be wiped out. One bit of road extends from that town to the state line and it is said to be about the worst in that section of the state. The selectmen have already undertaken to have a new stretch of road built and a new layout is being made.

The commission intends to put the only other bad stretch on the road, the one at Brookfield, in shape this summer.

Short News of Good Roads

KENOSHA, WIS., April 8—Aroused by the action of the Chicago-Milwaukee Good Roads Association in preferring to improve a main traveled highway between Chicago and Milwaukee which does not touch such principal cities as Racine and Kenosha, Wis., because of the antipathy displayed by residents of these cities, the Kenosha County board has busied itself and induced all townships in the county to make appropriations for highway improvement under the state aid law. The appropriations total more than \$20,000, which amount will be duplicated by the county and state together.

MADISON, WIS., April 8—W. R. Hirst, state highway engineer of the Wisconsin Highway Commission, which is in charge of the distribution of an annual fund of \$350,000 for permanent highway improvement, reports that nearly \$1,850,000 will be expended in highway work in Wisconsin this year. Townships of the state have appropriated \$600,000, which sum will be duplicated by the various counties and a like amount by the state.

PORTLAND, ME., April 6—Now that the first step in highway improvement by the state has been secured by the passage of a resolution by the state legislature favoring an amendment to the constitution to allow the state to increase its present borrowing capacity, limited now to \$300,000, motor dealers and owners of this city have begun a campaign to see that the voters adopt the amendment.

HARRISBURG, PA., April 9—In a recent interview State Highway Commissioner Bigelow stated that it was his purpose to have the road between Harrisburg and Gettysburg completed before the fiftieth anniversary of the battle of Gettysburg in 1913. It is expected that bids will be asked at once for the building of the road.

MINNEAPOLIS, MINN., April 8—Motorists are interested in the upholding of the new Elwell road law in Minnesota by which roads may be built at once, the cost to be paid in small installments for a long period, the state paying half, the county one-quarter and benefited property one-fourth. Bonds are issued to provide the funds. It is estimated that the result of the bill passage will be a tremendous amount of trunk road building.

Atlanta to Standardize Equipment

ATLANTA, GA., April 5—So heavy have become the automobile holdings of the city of Atlanta that the finance committee of the city council at its meeting yesterday decided that a city garage must be established. Here all the municipal machines except those of the fire department will be stored and repaired.

It was also suggested that the automobiles of the city be standardized, which doubtless means that hereafter one make of machines will be decided on and only cars of that make purchased.

New Trade Literature

Clever Examples of Printer's Art Used in Makers' Publicity

STEEL ANALYSIS—An eight-page pamphlet containing information on the Selection and Preparation of Steel Samples for Analysis and Test has been received from the Henry Souther Engineering Corporation, Hartford, Conn. This company maintains an up-to-date testing laboratory where chemical and physical work is done for automobile engineers and constructors.

APPENDICETOMY is the subject of a booklet published by the Boss Rubber Company, of Denver, Col. This company refers to tire trouble as the appendicitis of automobiling, and besides describing the various makes of tires which it handles, goes into the subject of tire repairs. The Boss concern undertakes these repairs and guarantees them to make the tires treated serviceable for a certain mileage.

ELECTRIC RUNABOUT—A leaflet of the C. E. Duryea Company, Saginaw, Mich., is devoted to a modest and matter-of-fact description of the pioneer's product Electa, which low-price automobile is constructed along lines similar to those of the Buggyaut. The folder is an interesting sample of simplified-spelling work.

REPUBLIC TIRES—A booklet called "Two-in-One" is presented to the automobile public by the Republic Rubber Company, of Youngstown, O. The pamphlet is divided in two sections, one beginning at either end of the booklet, and ending in the middle. The two subjects treated are the Republic Staggard Tread Tire and the Republic Black-Line Red Inner Tube.

AUTOMOBILES, 1912—The Automobile Board of Trade, 7 East Forty-second street, New York, has brought out its Ninth Annual Handbook of Gasoline Automobiles, describing the products of the makers forming that corporation. Some 500 different models are treated by giving their specifications and prices, and the 207 pages of the book are profusely illustrated.

TOURING IN THE WEST—The story of an automobile trip from Chicago to the Pacific Coast under difficult operating conditions is related in a small booklet published by the maker of the Rayfield carburetor, the Findeisen & Kropf Manufacturing Company, of Chicago.

CALIFORNIAN TOURING—The R-C-H Corporation, of Detroit, Mich., has published an illustrated folder dealing with the 3,000-mile trip which one of its cars recently made. The progress of the little automobile through the Golden State is reported and the most fascinating localities shown by photographic reproductions.

Chicago May Have Fall Truck Show

CHICAGO, April 6—The Chicago Automobile Trade Association, having had a taste of show promotion with its fall opening, is anxious to try its hand at something bigger and formal application has been made to the National Association of Automobile Manufacturers by President N. H. Van Sicklen and Henry Paulman, chairman of the show committee, acting independently of the association, for a sanction to hold a commercial motor vehicle show next fall in the Coliseum. The deal for the Coliseum has not been consummated as yet, that being a matter between the Chicago association and S. A. Miles. If it is impossible to get the building and the sanction is granted some other building will be taken. At any rate, the C. A. T. A. hopes to put on such an exhibition.

GENEVA, N. Y., April 9—Although Geneva is the smallest town in New York State to hold a motor exhibition, Manager Louis Blumenstein declares that the show just concluded here was a great success. Although the show was originally scheduled for only 2 days, it lasted for 4 days.

Among the New Books

A Treatise on Technical Writing—Reviews of Engineers' Proceedings

THEORY AND PRACTICE OF TECHNICAL WRITING. By Samuel Chandler Earle, Professor of English in the Engineering School of Tufts College. Published by the Macmillan Company, of New York. 295 pages, 12mo, with numerous explanatory illustrations. Price, \$1.25.

Dealing with a subject to which hitherto a merely tentative attention has been given, the author discusses in logical sequence the various phases of technical writing. In the introduction to the work the methods of study for the engineer, student and instructor are outlined. Definitions of the terms used in the discussion, a review of the common errors in the presentation of technical matter and the aim of the work itself are also taken up in the sixteen-page introduction. Part I deals with the different forms of presentation: Synopses, descriptive exposition, narrative exposition, directions and a combination of two or more of these methods. In Part II the essentials of logical structure and the methods of addressing different classes of readers are given special attention. In the appendix are several short articles culled from different technical works and journals. These are used as examples and are referred to throughout the book.

If the author has neglected to take fully into consideration the inborn ability of the aspiring writer, he has not failed to point out the proper method of analyzing and studying the subject of technical writing. The book is not intended for the general reader, but for the student who intends to prepare technical treatises, or the engineer making regular reports or who contributes to the technical press.

THE JOURNAL OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS. April number, published monthly by the society. 207 pages with cuts. Price, 35 cents.

Society affairs and general business, including a calendar of the coming meetings, are discussed. Abstracts from papers brought before the society, a foreign review and the preliminary report of the literature committee of the gas power section are given. The papers which are treated in the journal are as follows: "A Discussion of Certain Thermal Properties of Steam," George A. Goodenough; "Strength of Steel Tubes, Pipes and Cylinders Under Internal Fluid Pressure," Reid T. Stewart; "Equipment of a Modern Flour Mill on a Gradual Reduction System," John F. Harrison; "A New Analysis of the Cylinder Performance of Reciprocating Engines," J. Paul Clayton; "The Reduction in Temperature of Condensing Water Reservoirs Due to Cooling Effect of Air and Evaporation," W. B. Ruggles.

THE AUTOMOBILE ENGINEER YEAR BOOK, published by the Automobile Engineer Publishing Company, Ltd., London, England. 95 pages, unillustrated. Price, 1/-.

The tendency of engine design is clearly shown in this book, which is based on deductions made from the changes in design during the past two years. Section I is given over to a discussion of the trend of practice in the motor cylinders, thickness of materials, valve arrangements, machining, pistons, valves, shafts, connecting-rods, distribution gearing, crankcases, suspension, lubrication, carburetion, clutches, gears and gearboxes, shafts, torque and radius rods, rear axle, brakes, frame and sub-frame design. A very complete table follows in Section II. In this the principal details of 260 cars are tabulated. These cars are all of the 1912 touring car type. The details given in the table are as follows: Piston displacement, bore, stroke, stroke-bore ratio, mean valve diameter, piston weight including wrist-pin, per cent. volume of compression space, ignition, cooling, lubrication, clutch, brake type and position, type of drive and type of differential, gear ratios, springs, wheelbase, tread, tires, turning radius, radiator, torque members, frame construction. Other engineering data of value are also furnished.

News of the Week Condensed



Portland, Ore., is well supplied with commercial vehicles. A score of Packard trucks is here shown

BETTER TRAFFIC REGULATIONS—Members of the newly formed Lowell, Mass., Automobile League recently went over the matter of better traffic regulations for the Lowell streets and, having mapped out a plan, they appeared before the municipal council and argued for the adoption of their plan. It is believed that the regulations will be adopted.

New Orleans Buys Cars—The New Orleans, La., Sewerage and Water Board has called for bids for three light automobiles.

Cycle Man Made Mayor—Charles Stewart Mott, president of the Weston-Mott Company, has been elected mayor of Flint, Mich., on an independent ticket.

After New Members—C. H. Knowles, of the Maine Automobile Association, has started on a tour of the state to build up the organization and secure a lot of new members.

Brockton Garage to Enlarge—Plans have been approved for a two-story addition to the garage of W. H. Marble, Brockton, Mass., that will more than double the present space.

Breaks Arm Cranking—Floyd A. Allen, assistant general superintendent of the Buick Motor Car Company, Flint, Mich., recently sustained a fracture of the right arm while cranking an automobile.

New Garage in Springfield—R. A. McKee, one of the pioneers in Springfield, Mass., motor circles, has just signed a lease with the George Smith Company for the erection of a two-story building to be used as a garage.

New Britain Garage Improved—L. A. Gladding has secured a twenty-year lease of the brick garage and factory building owned by L. M. Barnes, New Britain, Conn., as the latter has decided to retire from the motor business.

Blacksmith's Spark Destroys Garage—Fire damaged Andrew Hanson's garage and machine shop on Washington avenue, Alpena, Mich., to the extent of \$6,000. A spark from the blacksmithing department was responsible for the blaze.

Organizing County Motor Club—A county motor club being organized at Waukesha, Wis., by A. L. Blackstone, who had succeeded in interesting nearly 100 owners in the city and county. The main object will be to improve highways.

Georgia Gymkhana in April—At the Georgia Chataqu., which will be held in Albany, Ga., April 16 has been set apart for automobile day. There will be a parade of decorated automobiles for prizes, a gymkhana and a series of short races.

Try to Organize Club—Efforts are being made by M. C. Moore, state organizer of the Wisconsin State Automobile Association, to organize a motor club in Racine, Wis. Several attempts have been made by local motorists in past years but without success.

Fire Trucks May Replace Horses—The common council of Auburn, N. Y., has practically approved Mayor O'Neill's recommendation that motor-driven fire apparatus replace the horse-drawn apparatus now in use in that city. The new machines would cost \$22,600 but this expense would be largely offset by the sale of the horses and old apparatus.

Railway Automobile Service Installed—Following an urgent appeal from the Crowley, La., Board of Trade and from business men in Abbeville and other towns on the Southern Pacific Railway Company's branch, the company practically has agreed to install such a service. Business over this line only justified one train each way a day, but the convenience of more frequent trips in an automobile is expected to result in greatly increased travel.

Opens New Sales Buildings—The George C. Brinkman Motor Car Company has opened a two-story sales building in St. Louis, Mo.

Opens Salesroom in York—The York Rubber Tire Company has opened a salesroom in York, Pa., and will deal in rubber tires and automobile accessories.

Headington to Manage Haynes—F. C. Headington has been appointed manager of the Indianapolis, Ind., sales branch of the Haynes Automobile Company, Kokomo, Ind.

Brakman on the Coast—A. B. Brakman has charge of the interests of the United States Motor Company on the Pacific Coast, including branches at Los Angeles and San Francisco.

Ambrose to Open Garage—F. O. Ambrose, Janesville, Wis., machine shop and boiler manufacturing, has purchased additional space and will open a garage and repair shop on April 15.

Houk Resigns from U. S. Motors—R. T. Houk, who for the past year has been sales manager of the Stoddard-Dayton division of the United States Motor Company, has resigned to enter another field of work.

Minnesota's Licenses Many—License tags are being issued by the secretary of state of Minnesota at the rate of 500 a day. The total for the year is 12,400, as compared with a total of 19,400 for last year.

Schmittdiel With Empire—R. H. Schmittdiel, recently manager of the Nebraska Regal Sales Company, Omaha, Neb., is now connected with the Empire Automobile Co., in the capacity of assistant sales manager.

Williams Changes Department—Charles R. Williams, who has had charge of the second-hand department of the Winton Motor Carriage Company, Seattle, Wash., will hereafter have charge of the truck department of the company.

Motor Tramway in Curacao—A motor car tramway has been placed in commission in Curacao, Dutch West Indies, on the east side of the channel. Two cars with a capacity of thirty passengers have been placed in service.

Many Overlands Exported—Another foreign shipment of thirty Overland motor cars left Toledo last Friday for Australia. This makes the second shipment to the antipodes since March 10, making the total to date seventy-five cars.

Richey Succeeds Townsley—G. A. Richey, formerly with the Central Rubber and Supply Company, has been appointed manager of the Columbia Knight department of the United Motor Indianapolis Company, succeeding H. A. Townsley.

May Establish Truck Line—An effort is being made to or-

ganize a company to conduct a motor transportation service between Indianapolis and Westfield, Ind. It is proposed to purchase two twelve-passenger motor busses and make two round trips a day.

Club Holds Banquet—The Waterbury, Conn., Automobile Club held its annual business meeting and banquet at the Hotel Elton recently, and it proved a big success. Motorists from a number of other Connecticut cities were present as guests of the club.

Many Entries for the Lu Lu Run—The first annual planked shad dinner and family outing of the Lu Lu Temple Automobile Club, Philadelphia, Pa., will take place on Saturday afternoon, April 20, the objective point being the Mohican Club at Morris Junction on the Delaware, N. J. As a demonstration of the interest aroused by the event, sixty-five entries have so far been received.

Hold Show in Barn—When the dealers of Lafayette, Ind., planned to give an automobile show, they found the only available building large enough for the purpose was a horse barn. Arrangements were accordingly made for the sales barn of the Lafayette Stock Farm Company, and the show was held April 4, 5 and 6. A hill climb was given as a special attraction. About forty cars were shown.

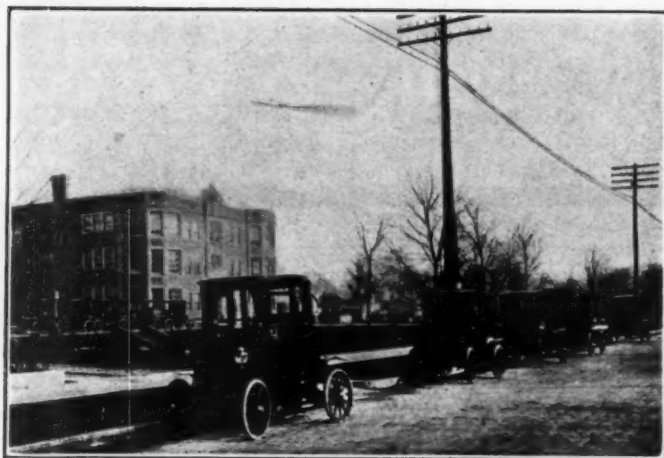
Buffalo Automobilists' Scheme—Buffalo, N. Y., automobilists have evolved an excellent scheme for making their chauffeurs very careful drivers. The scheme is this: The automobile owner pays his chauffeur a bonus in June and December if his car suffers no accident while in the chauffeur's charge, is not stopped for speeding and if nothing gets out of order with the machine that the chauffeur himself is unable to repair.

Tips Cause Crime—During the discussion of the anti-tipping bill, which recently was passed by the Mississippi legislature, one of the arguments which had much to do with the carrying of the measure was that tips were responsible for the percentage of criminality among chauffeurs. It was shown that many owners of taxicabs and other public motor cars received no salary but had to depend on the tips for their remuneration.

Packard Truck Business Good—The Packard Motor Car Company says it is now receiving more repeat orders from critical big buyers than at any time since starting in the truck business. Shipments in March were 85 per cent. larger than any previous months, sales in March were 50 per cent. greater than the corresponding month last year. The new truck shops are now in full swing with an output of five heavy duty vehicles every day.



Scene on Lake Washington section of Seattle's park boulevard system



Accidental social gathering of Waverly electric owners in Indianapolis

Doctor Plans Garage—Dr. J. W. Howell, Bryan, Tex., has plans for a garage and automobile supply building on Main street.

To Open Bids for Garage—The American Motor Company, Greensboro, N. C., will open bids about August 1, to erect a garage.

Garage Fire Loss \$150,000—The Hannan & Henry Garage, Ogdensburg, N. Y., was burned recently. The total loss, two buildings, is \$150,000.

Lowell Chauffeurs to Entertain—The Lowell, Mass., Chauffers Federation has arranged to have its third annual concert and ball at Lincoln Hall, April 25.

Hardwell Is Advertising Manager—O. R. Hardwell has been appointed advertising and publicity manager of the Paige-Detroit Motor Car Company, Detroit, Mich.

Garage for Baraboo—Philbrick & Mather, of Baraboo, Wis., have broken ground for a new garage building of fireproof construction. This is the fifth garage in Baraboo.

Proposes Traveling Auto Show—It is probable that some definite action toward conducting a traveling motor car show will be taken at a meeting of the Indiana Automobile Manufacturers' Association, to be held in Indianapolis, Ind.

Babcock has Big Territory—F. A. Babcock has been appointed manager of sales for the R-C-H Corporation in Minnesota, the Dakotas, Montana and northern Wisconsin. His headquarters will be with the R-C-H branch in Minneapolis.

Automobiles for Post Office, New Orleans, La.—The post-office department has authorized the use of automobiles in making deliveries and collecting mails. Trucks will be installed for handling mail to and from stations and docks.

Commerce Observer Encourages Opera—Twenty-six cars have already been pledged to make the trip from Commerce, Ga., to Atlanta and return for the Atlanta week of Grand Opera, April 22 to 27. This jaunt is being promoted by the Commerce Observer.

Opens Salesroom in Baltimore—Norwood Brothers, Inc., Baltimore, Md., have occupied their new quarters at 202 North street, with a line of Seitz, Lincoln and Elmore cars, trucks and delivery wagons. The Automobile and Accessories Manufacturing Company will likewise occupy a portion of the new building.

Gindrat Sales Manager—L. R. Gindrat, formerly manager of the Baltimore branch of the Franklin Automobile Company, Syracuse, N. Y., has been appointed sales manager for the Southern district. The territory under the direction of Mr. Gindrat includes North Carolina, South Carolina, Georgia, Alabama and Florida.

Results of Baltimore Election—New officers have been elected by the Professional Chauffeurs' Club, Baltimore, Md., as follows: A. F. Sheahan, president; Calvert Casey, vice-president; R. E. Shadel, secretary and treasurer; John J. Barrett, recording secretary; P. R. Becker, sergeant at arms; Robert Blume, F. J. Slade, J. E. Whitten and Thomas A. Smith, members of the board of governors. The club has a membership of 168 and is a branch of the national organization.

Plan Advertising Tour—The Continental Highways Advertising Company, Indianapolis, Ind., is planning an advertising campaign between that city and San Francisco, with a Mais motor truck. The route of the Premier ocean-to-ocean tourists is to be followed between the two cities. There will be five men in the party, which will be in the charge of Hugh Annis. The truck is to be equipped with portable wireless outfit, telegraph and telephone connection, typewriter and cooking utensils.

Boston Chauffeurs to Study—As a result of Mayor Fitzgerald's recommendation, the Franklin Union officials have started a course on gasoline motors and Mayor Fitzgerald has ordered that all city employes who drive automobiles shall take it. He goes further and states that all the employes who show exceptional aptitude for the work and get a certificate of proficiency from the Franklin Union should be given an increase in salary. The course will extend for 8 weeks, with three lectures a week.

Automobile Incorporations

AUTOMOBILES AND PARTS

AUGUSTA, ME.—Auto Tractor Company; capital, \$100,000; to manufacture, buy and sell machinery. Incorporator: L. J. Coleman.

BUFFALO, N. Y.—Eadie Vehicle and Gear Company; capital, \$200,000; to manufacture automobiles and parts. Incorporators: J. H. Eadie, Geo. P. Keating, S. H. Milloner.

CANANDAIGUA, N. Y.—William J. Hawley Auto Company; to manufacture automobiles. Incorporators: W. J. Hawley, Edson T. Case, Marion I. Case.

CLEVELAND, O.—D. G. Hutchcroft & Sons Company; capital, \$10,000; to manufacture and deal in automobiles. Incorporators: D. G. Hutchcroft, Glidden W. Hutchcroft, Thornton Hutchcroft, William Merts, S. H. Meacham.

EAST AURORA, N. Y.—East Aurora Motor Car Company; capital, \$8,000; to deal in automobiles. Incorporators: Manley B. Parson, W. S. Wilson.

EAST ORANGE, N. J.—Kadix Newark Motor Truck Company; capital, \$200,000; to manufacture motor trucks. Incorporators: G. F. Kallberg, L. L. Dann, R. M. Colcorn.

GALION, O.—Galion Motor Truck Company; capital, \$5,000; to make and sell pleasure and freight automobiles. Incorporators: J. A. Smith, E. A. Williams, E. A. Shearer, D. M. Yarger, W. L. Hampton.

GRAND RAPIDS, MICH.—Commercial Service Truck Company; capital, \$175,000; to manufacture motor trucks. Incorporators: Philip Moran, J. W. Laudman, G. H. Greenbauer.

GROVE PARK, N. C.—Grove Park Motor Car Company; capital, \$20,000; to make and sell automobiles. Incorporators: W. F. Randolph, J. S. Adams.

MIDDLETOWN, O.—Middletown Motor Car Company; capital, \$15,000; to buy and sell automobiles, parts and accessories. Incorporators: D. N. Gingerich, L. F. Steckrath, W. M. Warner, H. S. Mitchell, C. D. Hall.

MILWAUKEE, WIS.—Sigmund Auto Truck Company; capital, \$50,000; to manufacture trucks. Incorporators: Nicholas W. Marx, B. P. Marx, Jesse L. Stroede.

MOBILE, ALA.—Cadillac Motor Company; capital, \$20,000; to sell automobiles. Incorporators: C. W. Harrington, J. G. Adams, M. Harrington.

NEW YORK CITY—Combination Transmission Clutch Company; capital, \$10,000; to manufacture transmission mechanism. Incorporators: Louis E. Bomeisler, George Isaken, Herman Gustow.

NEW YORK CITY—Detroit Company of New York; capital, \$5,000; to conduct a general automobile business. Incorporators: Herbert G. Outwater, Andrew Walz, Jacob Walz.

NEW YORK CITY—"E. D." Gear Company; capital, \$60,000; to manufacture gears and other automobile parts. Incorporators: Daniel J. Rice, James P. Eadie, George Keating.

NEW YORK CITY—Non-Skid Chain Company; capital, \$250,000; to make chains and other devices which prevent the skidding of automobiles.

NEW YORK CITY—Royal Motor Truck Company of New York; capital, \$10,000; to sell freight automobiles. Incorporators: Arthur J. Cohen, William S. Weiss, Harry J. Leffert.

NEW YORK CITY—Yellow Taxicab Company; capital, \$5,000,000; to operate taxicabs. Incorporators: Samuel G. Trainor, Benjamin Bag, Lily Robinson.

PARKERSBURG, W. VA.—Logan Carriage and Automobile Company; capital, \$25,000; to manufacture and repair motor cars and other vehicles. Incorporators: Henry Logan, Thomas Page, Henry Huffman, Sherman Dils, B. F. Stout.

PHILADELPHIA—Glover Automobile Company; capital, \$5,000; to sell automobiles.

PHILADELPHIA, PA.—Moon Motor Car Company of Philadelphia; capital, \$100,000; to manufacture and sell automobiles. Incorporator: L. T. Edwards.

ROCHESTER, N. Y.—Pembroke Manufacturing Company; capital, \$50,000; to manufacture automobiles and parts. Incorporators: Charles J. Pembroke, Winfield P. Pembroke, Walker J. Fellows.

Miami Garage—A concrete garage will be erected by J. B. Wofford, Miami, Fla.

Ford Ships 8,004 Cars—The Ford Motor Company, Detroit, Mich., shipped 8,004 cars during March.

A Charleroi Garage—C. S. Van Voorhis and L. R. Kinder will build a new garage at Charleroi, S. C., immediately.

Hoefer to Build Garage—A three-story garage costing \$50,000 is soon to be erected by the Hoefer Ice Cream Company, Buffalo, N. Y.

Partnership Dissolved—The partnership of Saunders & Cole, Bryan, Texas, has been dissolved by mutual consent. Mr. Saunders will continue the business.

Garage in Cincinnati—The Norwood Machine Company will build a brick garage 63 by 110 at Main and Madison avenues, Cincinnati, O., at a cost of \$6,500.

Establishes Tire Shop—Arthur Williams, Portage, Wis., has established a tire and vulcanizing shop and will represent several manufacturers of motors and engines.

Another Garage Plan—Moorhead Wright, Little Rock, Ark., is having plans prepared by George R. Mann, Little Rock, for a garage on Pulaski Heights, to cost \$12,000.

Appropriation for Chief's Car—An appropriation of \$3,000 has been secured from the London, Ont., council for the purchase of an automobile for Fire Chief Aiken of that city.

Sleret Succeeds Edwards—E. E. Sleret, president of the

Ford Motor Car Agency, has assumed personal management of the Portland, Ore., Ford branch, succeeding Arthur J. Edwards as active manager.

Webster Motorists Hold Banquet—The members of the Webster, Mass., automobile club tendered a reception to the newly elected officers at the Joplin House recently which was attended by about forty members.

New Salesroom for Washington—The Cook & Stoddard Company, agent for the Pierce-Arrow, Cadillac and Baker, is erecting a large salesroom and service department on Connecticut avenue, Washington, D. C.

Wood a Branch Manager—R. A. Wood has been appointed manager of the newly established Los Angeles, Cal., branch of the Elmore Manufacturing Company. C. W. Hobson will have charge of the Fresno, Cal., branch.

Modern Garage in Bowling Green—The Bigelow garage building on North Main street, Bowling Green, O., has been rented by E. H. McKnight and John Smith and is being fitted up as a modern garage and machine shop.

St. Paul Wants Police Patrol—St. Paul proposes to buy an automobile wagon for the police department similar to the fire wagon. The fire commissioners intend to buy a 120-horse power motor fire engine to cost from \$8,000 to \$10,000.

Lynn, Mass., Dealers Dine—The members of the Lynn, Mass., Automobile Dealers Association held their first banquet last week at the Relay House, Nahant, Mass., and it proved such a big success that others will be held at regular intervals in the future.

Taxicabs in Atlanta—That the taxicab is soon to take the place of the horse-drawn cab in Atlanta, Ga., is evident. The Atlanta Cab and Baggage Company, which until now has depended entirely on horse-drawn vehicles, has installed ten Thomas machines and has ordered more.

Flynn Changes Jobs—James J. Flynn, who has been manager of the Zell Motor Car Company, has resigned to accept the position as manager of the Locomobile Branch in Washington, D. C. J. E. Macdonald, the former manager, has gone to Philadelphia to join the Packard sales force.

To Make Krebs Truck—A new concern has been organized at Clyde, O., to manufacture trucks. The new company will build a truck of 1,500-lb. capacity, with a two-cylinder, two-cycle, 4 1-2 by 5 1-2-inch motor, cylinders cast in block. Arrangements are being made to have the truck on the market in the very near future.

Kenosha Association Holds Election—Charles T. Jeffery, president of the Thomas B. Jeffery Company, has been elected president of the Manufacturers' Association of Kenosha, Wis. William L. Yule of the Badger Brass Manufacturing Company, and George H. Allen of the American Brass Company's local works were elected to the board of directors.

Automobile Incorporations

STAUNTON, VA.—Staunton Motor Company; capital, \$15,000; to do an automobile business. Incorporators: J. L. Baugher, J. H. W. Pison, G. A. Allen.

TOLEDO, O.—Dennis Motor Company; capital, \$25,000; to deal in automobiles, parts and accessories. Incorporators: C. H. Dennis, C. W. Close, Allen E. Reid, S. Woodrow, John G. Meister.

UTICA, N. Y.—Bauer-Jackson Auto Company; capital, \$2,000; to sell automobiles. Incorporators: Walter C. Bauer, Foster G. Jackson, George H. Jackson.

WILMINGTON, DEL.—Jiffy Auto Curtain Company; capital, \$100,000; to deal in automobiles and other vehicles.

WORCESTER, MASS.—Worcester Auto Parts Company; capital, \$10,000; to deal in automobiles. Incorporators: James N. Heald, Cyrus N. Cowan, John A. Doane.

GARAGES AND ACCESSORIES

BOSTON, MASS.—Chauffeurs' Legal Association; capital, \$10,000; to take care of chauffeurs' affairs. Incorporators: Jay R. Benton, George A. Kearsley, Francis D. Harrigan.

BOSTON, MASS.—Gray & Davis; capital, \$1,200,000; to manufacture lamps, dynamos and automobile accessories.

BRIDGEPORT, CONN.—United Foundry & Machine Company; capital, \$200,000; to do a foundry business. Incorporators: William C. Buckelow, Philip Murphy Beach, Andrew Steen.

DAYTON, O.—Dayton Auto Delivery & Service Company; capital, \$25,000; to do a general automobile and truck delivery business. Incorporators: John C. Hamilton, Sol Flatau, W. H. Speckler, Dr. H. C. McClelland, E. V. Menier.

DETROIT, MICH.—Simplex Self Starter Company; capital, \$10,000; to manufacture a self starter for automobiles. Incorporators: Wallace N. Osburn.

DETROIT, MICH.—Wolverine Tire Company; capital, \$25,000; to manufacture automobile tires. Incorporators: Ernest R. Robinson, Perry G. Robinson, Henry H. Smith.

GARY, IND.—Motor Bus Transit Company; capital, \$20,000; to operate motor buses. Incorporators: F. M. Stults, J. F. Crantham, J. W. Lyddick.

HASTINGS, N. Y.—Post Road Transportation Company; capital, \$100,000; to operate a motor bus line in Westchester. Incorporators: Geo. T. Brown, Cyrus F. Judson, Paul Nicholson.

KEOKUK, IA.—Keokuk Hydraulic Tire Setter Company; capital, \$50,000; to manufacture tires. Incorporators: C. A. Devero, J. A. Mock, M. L. Mock.

NEW BRITAIN, CONN.—G. E. Prentice Manufacturing Company; capital, \$100,000; to manufacture machines and tools. Incorporators: G. E. Prentice, Frank H. Johnston, F. H. Alvord.

NEW ROCHELLE, N. Y.—Cedar Garage & Marine Company; capital, \$2,500; to conduct an automobile and motor boat repair shop and garage. Incorporators: Fennell D. Franchling, Charles A. McGill, Albert B. McGill.

NEW YORK CITY.—Amsterdam Starter Company; capital, \$5,000; to manufacture automobile accessories. Incorporators: Rufus L. Weaver, Edwin S. Greene, Sarah S. Weaver.

NEW YORK CITY.—Eclipse Rubber & Tire Company; capital, \$50,000; to manufacture tires and other rubber goods. Incorporators: Simon J. Schwartz, Arthur A. Glass, Harry A. Bloomberg.

NEW YORK CITY.—Elsmere Cab & Car Company; capital, \$1,000; to do a general automobile hiring business. Incorporators: Eleanor Engledrum, John Engledrum, Mary E. Morgan.

NEW YORK CITY.—R. A. S. Spring and Bumper Company; capital, \$1,000; to manufacture springs and kindred accessories. Incorporators: George Steller, Victor H. Anderson, George E. Pinkenberger.

NEW YORK CITY.—Sullivan Garage Company, Inc.; capital, \$15,000; to operate a garage and repair shop. Incorporators: M. E. McAdam, John M. McAdam.



S. J. Nerdrum, Ballard, Wash., uses his E-M-F as a switch engine



One day's shipments of Packard trucks from the factory.

Smith Buys Garage—Clifford M. Smith has bought a garage at Ligonier, Pa.

Tieber Assumes Control—The Cleveland, O., Lozier branch is now in charge of P. J. Tieber.

Nash Takes Charge—The city sales department of the Cleveland, O., Buick branch is to be in charge of V. L. Nash.

Sheehy Promoted—William Sheehy has been promoted to the position of manager of the Albany Garage, Albany, N. Y.

Ajax Agency Opened—An agency for Ajax tires has been opened in Cincinnati, O., by A. G. E. Hanke and E. H. Rothe.

Downey Superintendent—Joe Downey has been appointed superintendent of the Taxi Service Company's garage, Boston, Mass.

Mayor Chosen President—Mayor Charles E. Hatfield, of Newton, Mass., has been chosen president of the newly-formed Newton Automobile Club.

Bessemer in New England—The Bessemer Motor Truck Company, Grove City, Pa., has opened salesrooms in Boston, Mass., with R. G. Howard as manager.

Hardwell with Paige-Detroit—O. R. Hardwell has accepted the position of advertising manager for the Paige-Detroit Motor Car Company, Detroit, Mich.

Motor Stage Line Planned—If plans that have been under consideration for some months go through there will be a motor stage line running soon between Rockland and Augusta, Me.

Matheson Moves to 'Frisco—The Matheson Sales Company, which heretofore has made its main offices in Oakland, Cal., has decided to make San Francisco its headquarters. The Oakland office will be maintained as a branch.

Boston Garage Opened—The Taxi Motor Cab Company, Boston, Mass., has moved into the Cyclorama building on Tremont street, where it has two floors, each with 16,000 square feet of floor-space. The company occupies the entire building.

Studebaker March Output Large—All records for quantitative manufacturing were broken during March by the Studebaker Corporation, whose Detroit factory produced an almost equal number of E-M-F and Flanders automobiles, to the combined value of \$4,276,000.

Lumbermen Using Trucks—Maine lumbermen have been making good use of motor trucks and tractors this winter in hauling logs out of the woods. No matter how rough the going, the motor trucks have hauled many logs through the woods to the edge of the streams in better time than horses.

May Stop Joy-Riding—A stop will be put to joy-riding in California if a recently enacted statute is upheld. It provides that any driver of an automobile who while intoxicated shall

New Automobile Agencies

PLEASURE CARS

| Place | Car | Agent |
|-----------------------|--------------------------------------|--------------------------------------|
| Baltimore, Md. | Havers | C. R. Foutz. |
| Boston, Mass. | S. G. V. | Frederick E. Randall Co. |
| Boston, Mass. | Empire | Empire M. C. Agency. |
| Boston, Mass. | Paige-Detroit | H. L. Johnson. |
| Boston, Mass. | Selden, Lion and Chadwick | Whitney-Barney Co. |
| Brookline, Mass. | Elmore | Regent Circle Garage. |
| Buffalo, N. Y. | Empire | Frontier M. C. Co. |
| Chicago, Ill. | Westcott | W. T. Cluney. |
| Cincinnati, Ohio | White | White Motor Car Co. |
| Columbus, Ohio | Ohio | Oscar Lear M. C. Co. |
| Columbus, Mo. | Ford | Schunk Bros. |
| Cuddebackville, N. Y. | Westcott | C. V. Fredmore. |
| Denver, Colo. | Abbott | Western M. C. Co. |
| Granville, Ill. | Franklin | Sidney Whitaker. |
| Greenburg, Pa. | Franklin | Standard Auto Co. |
| Indianapolis, Ind. | Empire | Gibson Auto Co. |
| Janesville, Wis. | Reo | F. O. Ambrose. |
| Lorain, Ohio | Overland | Jackson-Harrison Auto Sales Company. |
| Mexico, N. Y. | Franklin | Charles H. Everts. |
| Montreal, Canada | Abbott | Victor Levesque. |
| Newark, N. J. | Empire | Oakland Agency. |
| New London, Conn. | Maxwell | N. V. and H. N. Porter. |
| Newport News, Va. | Abbott | R. J. Rhodes. |
| New York, N. Y. | Empire | Cimioti Bros. |
| Norwood, Ohio | Westcott | Bush Parker. |
| Norwood, Ohio | Abbott | Norwood Machine Co. |
| Patton, Pa. | Ford | A. C. Fisher. |
| Philadelphia, Pa. | Michigan | B. M. Sharp and S. Humphrey, Jr. |
| Plymouth, Pa. | Abbott | Reese Machine & Tool Wks. |
| Portland, Ore. | White | E. W. Hill. |
| Rochester, N. Y. | Empire | Abbott-Detroit Sales Co. |
| St. Louis, Mo. | Empire | Johnson Auto Co. |
| St. Paul, Minn. | Marquette | Western Auto Co. |
| San Francisco, Cal. | Courier-Clermont | Standard M. C. Co. |
| San Francisco, Cal. | Herreshoff | Pacific M. C. Co. |
| Spokane, Wash. | Oldsmobile | G. S. Morrow. |
| Sterling, Colo. | Franklin | Ideal Auto & Machine Co. |
| Syracuse, N. Y. | Empire | James Auto Co. |
| Toledo, Ind. | E.M.F., Flanders | Blevins Auto-Sales Co. |
| Toledo, Ohio | Alco, Rambler, Cino, Detroit, Elect. | Dennis M. Co. |
| Toledo, Ohio | Reo | L. L. Blood. |
| Trenton, N. J. | Empire | Risdon M. C. Co. |
| Washington, D. C. | King | H. B. Lear. |
| Washington, D. C. | Mitchell, Rambler | Robert H. Love. |
| Washington, D. C. | King | Robert H. Love. |
| West Hartford, Conn. | Empire | G. L. Kaesser. |
| York, Pa. | Cartercar | Lecrone Garage. |
| Zanesville, Ohio | Abbott | Zanesville Taxicab Co. |

COMMERCIAL VEHICLES

| Place | Car | Agent |
|-------------------|-----------|-------------------|
| Alexandria, Va. | Board | Everitt Co. |
| Boston, Mass. | Grabowsky | L. S. McCreary. |
| Somerville, Mass. | Sanford | Brooks & Palmer. |
| St. Louis, Mo. | Poss | Poss M. Truck Co. |

be a party to an accident shall be guilty of felony, and shall be subject to the severe penalties provided therefor.

Many Registrations in Ohio—The month of March was an active one for the Ohio State Automobile Department, according to the report of Registrar J. A. Shearer. During the month 6,400 owners were registered and 550 chauffeurs were licensed. The total receipts for the month were \$26,836.21.

Morse-Readio Approves Plans—The plans approved for the new building to be erected at Dwight and Chestnut streets, Springfield, Mass., for the Morse-Readio company call for a six-story building with 78 feet frontage and a depth of 97 feet. The first floor will be devoted to trucks and the other floors to general service.

Howell Made District Manager—E. F. Howell has been appointed district manager for the Chase Motor Truck Company, Syracuse, N. Y. He will make his headquarters at the Philadelphia branch of the company, and his territory will include portions of Maryland, Pennsylvania and New Jersey and the State of Delaware.

Two Moves in Seattle—Two of the leading automobile agencies of Seattle, Wash., have shifted quarters. The Packard Motor Car Company is vacating the building it has occupied at East Belmont avenue and East Pike street to go into its splendidly equipped home at Twelfth avenue and East Pine. The Locomobile agency, handled by Thomas-McKay Company, will take the building being vacated by J. T. Keena & Company.

Factory Miscellany

GRAMM PLANT BUSY—The plant of the Gramm Motor Truck Company, Lima, O., is busy these days trying to supply the spring demand for trucks of all sorts. Since John N. Willys, president of the Willys-Overland company, bought the controlling interest in the Gramm company the 2,000 Overland dealers throughout the country will act as an outlet for the trucks produced at the Lima plant. The plant itself is the largest truck factory in the world, occupying 22 acres of ground. There are 6 1-4 acres under one roof, and 1,200 men are employed. The buildings are of steel and reinforced concrete and are valued at \$1,250,000.

Briggs Begins Building—The Briggs Manufacturing Company, Detroit, Mich., has begun work on the construction of a new factory at Denton avenue and the Grand Trunk Railroad.

Building Extension in Beloit—The Fairbanks-Morse Company, Chicago, Ill., is building an 80 by 130-foot extension to its Eclipse works at Beloit, Wis.

Leases Rubber Tire Factory—The Cooper Diamond Company has leased the three-story factory building at 1717 Eighth avenue, Brooklyn, N. Y., to Leslie R. Pratt, for the manufacture of rubber tires.

To Build Parts Factory—The St. Paul Rim & Axle Company, St. Paul, Minn., is arranging to erect a factory for the manufacture of automobile parts, including axles, transmissions, rims and forgings.

Buick Considers Minneapolis Plant—H. J. Tremsin, secretary of the Commercial Club, Minneapolis, Minn., has written to the General Motors Company at Detroit, Mich., suggesting Minneapolis as the place for the proposed new factory.

New Location for Saxon—Within the next 3 months the Saxon Manufacturing Company, Toledo, O., manufacturing automobile lamps and horns, will be located in the five-story brick building formerly occupied by the Dow-Snell Company, on Cherry street.

To Erect New Factory—The Murphy-Potter Company, Detroit, Mich., is preparing to erect a new plant for the manufacture of brass specialties and automobile parts. The company

intends to purchase some power transmission machinery and machine tools for brass working.

To Build Body Factory—An automobile body factory is to be established at Windsor, Ont., by the National Body Company, Ltd. A three-acre site has been purchased for a two-story brick factory, 300 by 55 feet, to cost \$35,000.

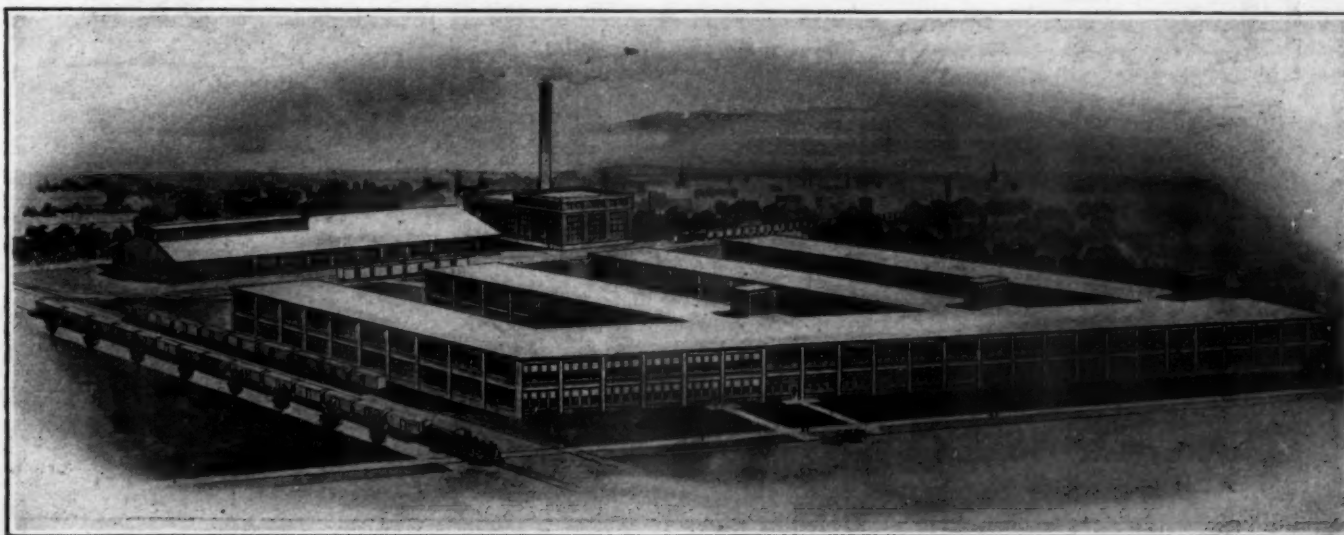
Goes Into Trucks—The Van Winkle Gin & Machine Company, Atlanta, Ga., has sold its machinery plant and is having plans drawn up for a new factory which will be used for the manufacture of motor trucks. The models built are of 1,500 pounds, 1 1-2-ton, 2 1-2-ton and 3 1-2-ton capacity.

Lauth-Juergens Expands—Plans are being prepared by the Allyn Engineering Company, Cincinnati, O., for a one-story brick-and-steel addition to be made to the plant of the Lauth-Juergens Motor Car Company, Fremont, O. The building will be 60 by 200 feet.

New Quarters for Day—The Day Automobile Company, Detroit, Mich., which has been building its Day utility car in rather modest quarters for some time, has closed a 5-year lease for a commodious building at 25 Milwaukee avenue E., and is now putting the building into shape for occupancy, and installing machinery. The building gives the Day company 20,000 square feet of floor space.

Gray & Davis Incorporate—It has just been announced that Gray & Davis, of Boston, manufacturers of automobile lamps and dynamos, have incorporated under the laws of Massachusetts, with a capital stock of \$1,200,000. This incorporation was made necessary by the growth of the business during the past year—a growth that has been little short of phenomenal.

Two New Overland Deliveries—The Willys-Overland Company has perfected two new delivery wagons, both mounted on model 59 chassis. They will be known as model 59 delivery special and model 59 delivery express. The former is fitted with a covered body, while the latter has an open body. The carrying capacity of each is 800 pounds. These vehicles are designed especially for merchants who require rapid delivery of small and medium-sized parcels.



Gramm Motor Truck Company's plant at Lima, O. It is the largest truck factory in the world

Newest Ideas Among the Accessories

Device for Lifting a Car; Leather Preservative; Coating Brass; New Leaf Spring; Sixfold Tool; Racks for Storing Parts; New Lighting Outfit

Page Auto Hoist

THE Page automobile hoist, Figs. 1 to 3, is constructed with the object of easily and quickly raising a car off the ground, to relieve the tires from supporting the weight of the machine in the garage and also from being chilled by contact with the cold garage floor. The hoist consists of four pressed-steel beams, one end each being hinged to a horizontal bolt, while the other end is equipped with a leg. The legs L on one pair of beams are stationary and spaced by a cross-bar; the other two legs may be folded into alignment with the long beams, when there is no automobile resting upon the hoist. Fig. 2 shows the mechanism by means of which the hoisting beams and the car resting on them may be raised, this mechanism consisting of a long left and right-hand screw located on a base and held in two end bearings. Each of these threads is fitted with a nut and the two nuts are connected to the bolt on which the four beams are hinged. A long rod having a crank on one end is connected, by a knuckle joint, to the screw, and by turning the handle or crank of the rod, the nuts engaging the screw and linked to the cross-bolt may be moved toward or away from the center of the screw, thereby raising the bolt and the inner ends of the beams with the load resting upon them.

The manner of applying the hoist is indicated in Fig. 3. The car is driven up the hoist, so to speak, by first passing the knock-down end of the hoist between the front wheels of the machine, and driving the automobile forward till its center is above center of the hoist. Then the knock-down legs are placed in erect position and the crank is turned to raise the automobile. The first four turns raise the hoist sufficiently to take the load off the tires, and the next four lift it fully off the ground. The capacity of the hoist is 15 tons, which is ample for any requirement. The

hoist is lowered by applying the same number of turns as in raising it, but in the opposite direction.

The material used in the construction of the hoist is steel for the beams, screw and bolt-hinge, brass for the minor fittings and malleable iron for the legs and baseplate. It is made in four sizes, to fit any type of pleasure or commercial car. The height of the legs is adjustable. The Page Auto Hoist Company, of Grand Rapids, Mich., manufacture this device.

Black Leather Dressing

Rie Nie Enamel Dressing is the name of a thin liquid which is manufactured for the purpose of refinishing worn leather, rubber fabric and Pantasote. The Rie Nie Manufacturing Company, Minneapolis, Minn., claims that the application of this chemical softens and waterproofs the material, and that the enamel finish produced by Rie Nie is not affected by moisture or heat. The time necessary for tops to dry is given by the makers as 5 hours, while cushions are ready for use about 12 hours after application.

Gun-Metal Brass Coating

Three preparations for coating brass parts with black finish of different kinds are being manufactured by the Gun Metal Finish Company, Decatur, Ill. These compositions are of such consistency that they may be applied by means of a brush, and all three are so composed as to dry within 1-2 hour. The first of these products is a bright gun-metal finish, which is easily applied and turns the brass parts black. As a continued exposure to heat hardens this finish, but does not injure it, it is especially useful for coating lamps and radiators. A dull gun-metal finish which, when dry, resembles hard rubber in appearance, is applied in the same manner as the first product. It is

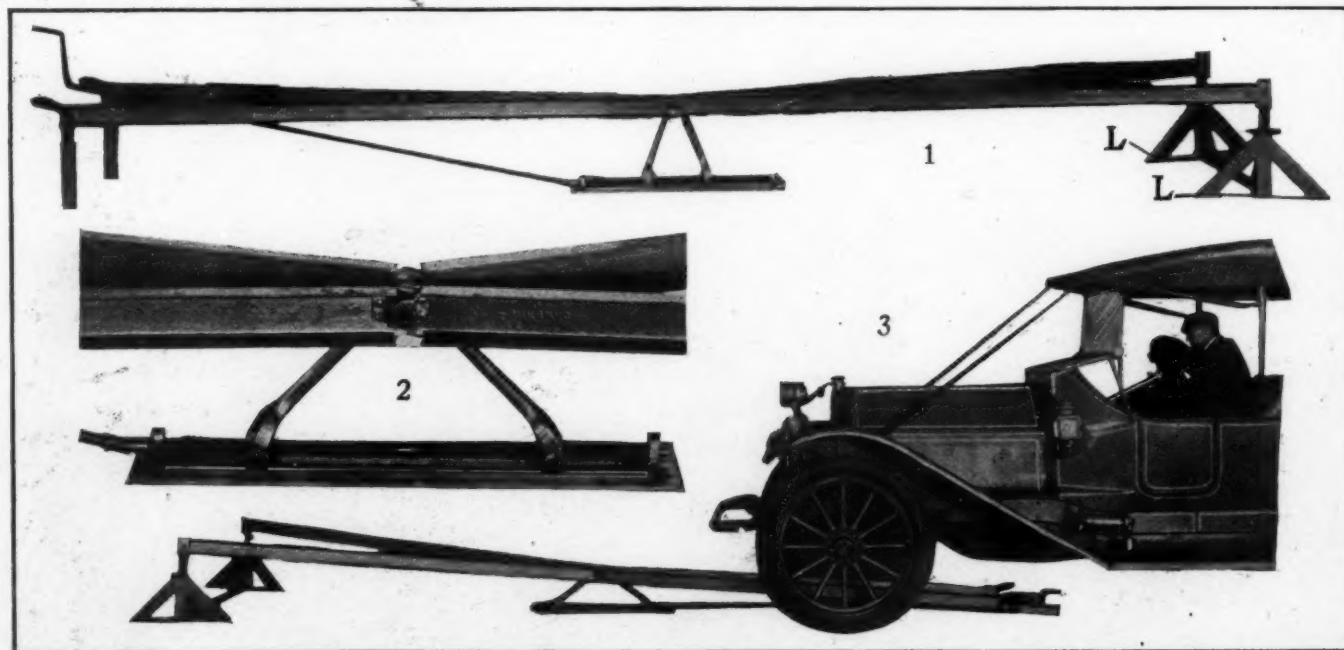


Fig. 1—Page hoist in upright position. Fig. 2—Worm-and-nut mechanism for raising load. Fig. 3—Driving the car over the hoist to be jacked up

claimed by the makers that this finish will not crack or peel owing to the influence of heat or dampness. The last product of the series is composed of two preparations. A dull, elastic finish is applied to the brass as a primer and dries in 30 minutes. When dry, it is covered with a coat of the second composition which produces a high-gloss, enamel-like, rubber finish. For making the last finish, 1-2 pint each of the dull elastic primer and the glossy rubber composition are used.

Titanic Boltless Spring

The Titanic spring, Fig. 4, is of the leaf type. It is made of titanium steel, the use of this metal guaranteeing a high degree of toughness. In order to obtain the full strength of the spring leaves, they are not held together, in the usual manner, by a center bolt, its place being taken by two brackets gripping two points near the center of the spring and holding it to a baseplate, the latter being fixed to the axle by means of a stud of the plate entering a corresponding hole in the axle. Each of the leaves is given a slight rise in its center portion, this feature, together with the brackets, insuring a secure interlocking of the spring leaves. The Titanic spring is guaranteed against breakage and settling by its makers, the Tuthill Spring Company, 760 Polk street, Chicago, Ill.

U-Vulk Tire Repair Case

A tiny case containing the means for making ordinary tire repairs is made under the name of U-Vulk, by the Gem City Liquid Vulcanizer Company, Dayton, O. Besides a dozen tube patches and a roll of para rubber, the case contains a small can filled with a rubber solution, a brush for applying it, and some emery cloth. The vulcanization is effected without special heat application, as, according to the maker, the warming of the tire during travel suffices to cure the newly-applied rubber.



Fig. 4—Titanic boltless elliptic spring

T-F Lighting Outfit

A new lighting outfit for Ford model T cars is made by the R. C. Hull Electric Company, 1820 Euclid avenue, Cleveland, O. Like other outfits for this purpose the T-F utilizes the surplus current generated by the Ford magneto for feeding two electric headlights. The lamps are of the parabolic type and the tungsten bulbs are equipped with a sliding socket to permit of correct focusing, the bulbs being held in place by a bayonet lock base. The wiring is made of the same kind of material as the commutator wires of the Ford magneto. Besides bulbs, reflectors and wiring the outfit includes a push button switch and the necessary terminals and clamps.

Dover Thermo Case

A receptacle for carrying three 1-pint thermos bottles is manufactured by the Dover Stamping and Manufacturing Company, Cambridge, Mass. The case is made of steel and measures 10 by 11 by 4 inches. It is lined with corrugated cardboard to protect the bottles against shock while the automobile is running. One of the bottles may be replaced, if the buyer desires, by a specially-designed sandwich box.

Detroit Combination Tool

A tool of six-fold use, the Detroit combination tool, is seen in Fig. 5. This device may serve as a forge, anvil, vise, pipe vise, emery wheel and drill press, and contains all the accessories necessary in the operations calling for these tools. The firepot

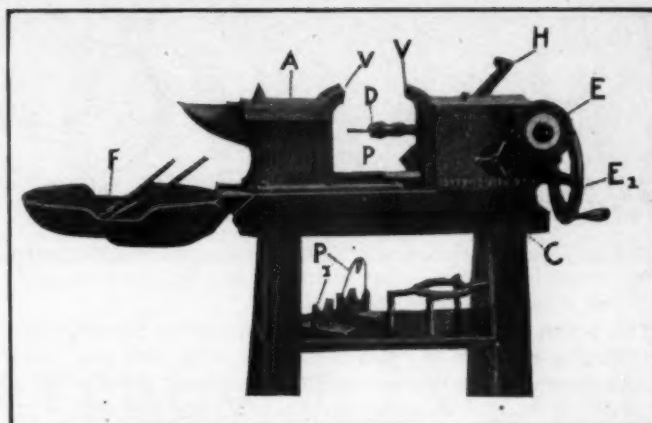


Fig. 5—Detroit combination tool for six-fold use

F of the forge is circular, 16 inches in diameter, and the blast is supplied by a rotary blower incased in a scroll-shaped fan housing. The anvil A is 13 inches over all, the polished surface being 4 by 6 inches. It is made of high-grade, chilled manganese iron; the horn is long and sharp and machined. The vise is seen at V, being adjusted through a screw by the handle H. The vise has 4-inch jaws and a maximum opening of 8 inches. The movable part of the vise is the anvil which slides on two guides beveled to fit the anvil. The pipe vise consists of two jaws P which are inserted by the operator at P, and regulated by the same steel screw which moves the anvil portion of the vise. The pipe vise fits any pipe from 1-8 inch to 3 inches in diameter. The 5-inch emery wheel E may be driven by hand, through the wheel E1, at 2,000 revolutions per minute. It is removable and its place may be taken by a buffing tool. The drill D of the drill press is fitted with a Barber adjustable chuck and drills up to 1-2 inch may be used. The wheel E1 is used for driving the drill which is geared 2 to 1. This tool is sold at a very moderate price by the manufacturer, the Detroit Tool Company, Detroit, Mich.

Berger Steel Racks

A steel rack of large capacity, designed for storing parts, packages, etc., is shown in Fig. 6. This rack is made by the Berger Manufacturing Company, Canton, O., and consists of four units, each 60 inches long, 40 inches wide and 11 feet 6 inches high. Provision is made for twelve shelves per unit, each shelf being a steel plate capable of sustaining a load of 250 pounds, making the carrying capacity of each unit 3,000 pounds. The steel beams constituting the rack proper are riveted together, and punched for additional rivets to be used in installing the shelf plates.

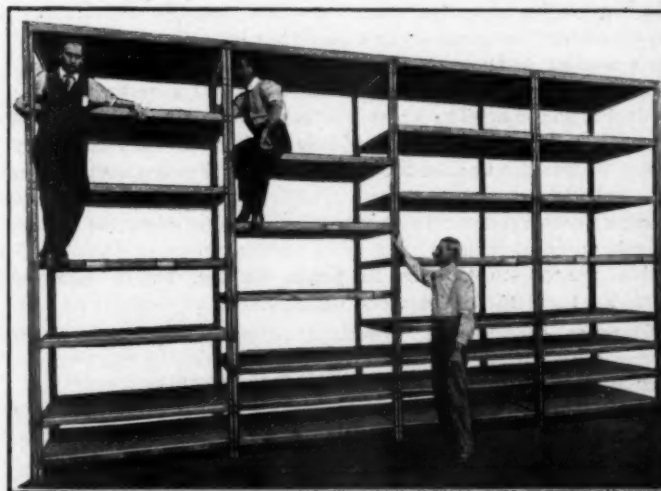


Fig. 6—Berger quadruple steel rack; capacity, 12,000 pounds

Patents Gone to Issue

SAFETY Crank—In which cam surfaces disengage the crankshaft from a shaft between it and the crank, as soon as it takes up rapid rotation.

This patent relates to a crank, Fig. 1, which has an extension C₁ carrying a sleeve S₁; this sleeve has teeth with cam surfaces adapted to engage corresponding surfaces T on a ring R₁ which is integral with the crankshaft E. To the shaft E is fastened a clutch member C₂ ending in a flange F and counter-bored to accommodate the ring R₁. Thus, if the teeth of S₁ en-

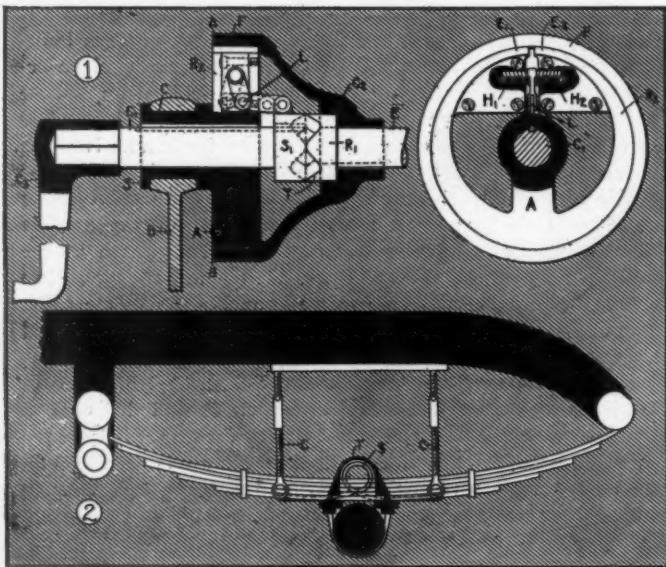


Fig. 1—Engel safety crank. Fig. 2—Woodring shock absorber

gage those of R₁ and the crank is then rotated, the crankshaft is turned over. The extension C₁ is splined to a sleeve S which has annular groove around which is fitted the bearing B which supports the shaft.

The end of the sleeve S adjacent to the crankshaft is so shaped as to provide a clutch member connecting the extension or intermediate shaft to the ring R₁. The clutch member on the end of C₁ consists of a ring R₂ and an arm A by means of which the ring is keyed to the shaft C₁. The ends E₁ and E₂ normally engage the inner surface of F, but they may be contracted to a smaller diameter by turning the screwed ends H₁ and H₂ of a cross-bolt in the threaded blocks which are secured to the ends E₁ and E₂. The cross-bolt is connected by a bell crank lever L to the sleeve S₁, and their position is such that they press E₁ and E₂ against the flange F when the cam surfaces on S₁ and R₁ are in engagement, and that they contract when these cam surfaces are disengaged by slipping when the engine speeds up or backfires.

No. 582,100—to Charles R. Engel, Oaklyn, N. J. Granted May 23, 1911; filed September 14, 1910.

Bumper—Utilizing the principles of spring and wedge, both being contained in a tubular support attached to the chassis frame.

This patent refers to an automobile bumper, Fig. 4, composed of tubular supports T which are fixed to the frame of the vehicle and hinged members carrying the bumper bar B and entering the supports. The latter contain cushioning springs and spring-pressed gibs are provided to hold the hinged members closely against one side of the supports. The resistance of this bumper

is thus at all times in direct proportion to the force of the collision.

No. 1,021,796—to John P. Randerson, Albany, N. Y. Granted April 2, 1912; filed October 14, 1910.

Shock-Absorber—In which a coil spring assists the elliptic spring in checking relative movement of axle and frame.

The idea of this patent is illustrated in Fig. 2. In combination with a frame and axle, there is a tubular member T mounted on the latter and containing a coiled spring S, the ends of which are transversely laid across the axle and led to vertical supports C connecting them to the chassis frame. The spring resists relative movement of the frame and axle thereby assisting the elliptical spring in its work.

No. 1,022,015—to James H. Woodring, Corry, Pa. Granted April 2, 1912; filed August 29, 1911.

Shock-Absorber Adjustment—Comprising means for clamping a ring carrier holding flat springs which bear against a multiple-throw cam.

The adjustment referred to in this patent is intended for use in shock-absorbers of the flat-spring and cam type, Fig. 3. The shock-absorber consists of a single or double arm A₁ integral with a housing H, and an arm A₂ connected to a multiple-throw cam C, the depressed portions of which normally contact with flat springs S. A ring carrier R is fitted approximately within the walls of the housing, being adjustable relatively thereto. The housing has a slot adjacent to the outer side of the ring carrier which carries clamping means secured in a relatively fixed position to the housing. The clamping means project through the slot mentioned, means being provided on the outside to adjust the clamping means and hold them securely in position.

No. 1,022,145—to Buton L. Lawton, Meriden, Conn., assignor to the Connecticut Shock-Absorber Company, Meriden, Conn. Granted April 2, 1912; filed January 4, 1912.

Steering Wheel Heater—The steering wheel has a hollow hub through which hot air is passed which is exhausted at the rim of the wheel.

This patent refers to an arrangement for heating the steering wheel, Fig. 5, comprising a receptacle R which is filled with cold air, by a fan or otherwise. This air is heated by contact with the engine walls and is then led through a pipe to a fixed portion of the chambered hub of the steering wheel, flowing from there through the spider to the hollow rim, whence it exhausts into the atmosphere.

No. 1,022,273—to Grant E. Smith, Poughkeepsie, N. Y. Granted April 2, 1912; filed March 17, 1911.

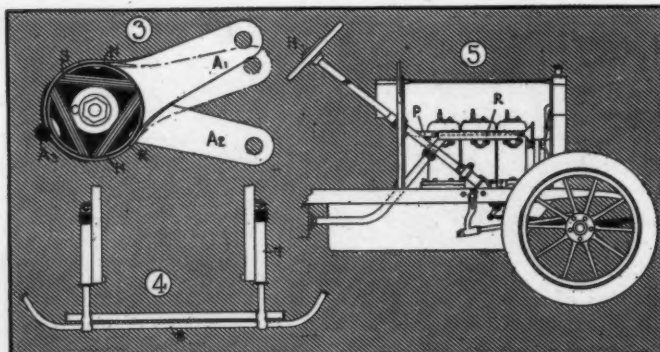


Fig. 3—Lawton shock-absorber adjustment. Fig. 4—Randerson bumper. Fig. 5—Smith steering wheel heater